PROGRAM REVIEW

Fairmont State Board of Governors

☐ **Program with Special Accreditation** ☒ **Program without Special Accreditation**

Date Submitted April 1, 2013

Program Bachelor of Science in Computer Science
Degree and Title

INSTITUTIONAL RECOMMENDATION

__X__ **1. Continuation of the program at the current level of activity;**

____ **2. Continuation of program with corrective action;**

____ **3. Identification of the program for further development;**

____ **4. Development of a cooperative program with another institution, or sharing courses, facilities, faculty, and the like;**

____ **5. Discontinuation of the Program**

Rationale for Recommendation:

The faculty involved with the teaching of computer science and computer security has continued to make improvements in their curriculum and in fostering undergraduate student research. Upon securing an additional terminal degreed faculty, the program should be able to move forward with ABET accreditation.

These programs of study continue to have increases in their enrollment, and graduates are able to obtain positions within business and industry or continue their education within the state of West Virginia. These are indicators of a successful program. The program faculty needs to continue with the collection of assessment data on a yearly basis. The continuation of these programs is highly recommended by the Dean of the College of Science and Technology.

Mahmood Hossain **Signature of person preparing report:**	04/11/13 **Date**
Anthony F. Gilbert **Signature of Dean**	4/11/13 **Date**
Christina Gavrata **Signature of Provost and Vice President for Academic Affairs:**	4-18-13 **Date**
Maria C. Rose **Signature of President:**	5-13-13 **Date**
Ken L. Tucker **Signature of Chair, Board of Governors:**	5-16-13 **Date**

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Executive Summary for Program Review

Name and degree level of program

Bachelor of Science in Computer Science

External reviewer(s)

Mr. Jeff Tucker
Chief Technical Officer
Innovative Technology and Management Services, Fairmont

Mr. Brian McKibben
IT Specialist
Criminal Justice Information Services Division
Federal Bureau of Investigation, Clarksburg

Synopses of significant findings, including findings of external reviewer(s)

Students successfully completing this program gain an understanding of the concepts of computer science. Graduates are able to move immediately into entry level software development positions or can pursue graduate school with minimal additional coursework. One of the external reviewers has been very pleased with the quality of the computer science graduates who enter the workforce in the High-Tech Corridor. He has found the program curriculum to align well with computer science programs at other institutions. The program graduates have received satisfactory ratings from employers regarding their preparedness. The employer surveys have been used to identify areas for program improvements.

The enrollment in the CS program at FSU is expected to increase because of projected high demand for computing related jobs. The high-tech area in North Central WV has a high demand for computing professionals and a continuous growth of the computer science program at FSU can only benefit the community and reduce the dependency of the companies on out-of-state recruitment. As one external reviewer pointed out, the retention rate within the Computer Science program can and should be improved. The low retention is a national trend across CS programs that can be attributed to lack of math preparedness.

The computer science curriculum went through a major revision in 2009 with added computer science and math requirements. The purpose of this revision was to align the program more with the guidelines of Association for Computing Machinery (ACM) and Accreditation Board for Engineering and technology (ABET). Incorporating IBM enterprise computing in the curriculum is also expected to strengthen the CS program.

Plans for program improvement, including timeline

Improving the retention rate will be one of the major goals in the next five years. This will involve revisiting the math requirements for the program and some early advising effort regarding math. As an external reviewer suggested, the program faculty will utilize peer mentors and industry mentors to help students realize the need to stay in the program.

The assessment data for all individual courses will be collected within one year.

The employer satisfaction survey for this cycle will be completed within one year.

A graduate satisfaction survey will be implemented within one year.

The computer science program is planning to apply for Accreditation Board for Engineering and Technology (ABET) accreditation within the next five years.

The computer science program is expecting that a new PhD faculty will be hired beginning Fall 2013.

Identification of weaknesses or deficiencies from the previous review and the status of improvements implemented or accomplished

There were two recommendations from the previous program review; more effort in recruitment and retention and collection of assessment data. The CS faculty has participated in more recruitment activities in the past five years at both the university and department levels (e.g., campus visitation days, Engineering and Science Challenge, etc.) and also reached out to the local schools. The increased recruitment efforts have played an important role in increasing the number of students in the computer science program. The retention rates needs to be increased though, as one external reviewer pointed out. Regarding the assessment, the CS faculty has been working on developing a viable programmatic assessment plan that includes assessing both program outcomes and individual course outcomes. Program outcomes have been developed with direct assessment measures. Learning outcomes have also been developed for all individual courses. The assessment data is being collected.

Five-year trend data on graduates and majors enrolled

The number of graduates and the number of computer science majors have increased over the past five years. The number of majors increased from 72 in the fall of 2007 to 103 in the fall of 2011 (mean 86.4 ± 11). The following table shows the total number of students enrolled in the computer science program (at the end of Fall semester) over the past five academic years.

Year	Computer Science	Computer Security	Total
2007-08	56	16	72
2008-09	65	14	79
2009-10	68	26	94
2010-11	60	24	84
2011-12	74	29	103

Five years ago, enrollment in CS programs nationally bottomed out after declining for the previous five years. In the past five years, enrollments nationally have increased roughly 10% per year. Over the past ten years, CS enrollment at FSU has remained relatively constant. No decline was experienced in the first five years, and no rebound was experienced in the recent five years. The CS program is a small program, and the numbers are in the double digits, so a fluctuation of only a few students in one year can appear to be a significant increase or decrease in enrollment. The standard deviation in enrollment is fairly high, but the 5-year mean has remained steady or slightly increased over the past ten years.

The number of graduates from the computer science program increased from 5 in 2007 to 13 in 2011 (mean 7.8 ± 3.5). The graduation count is expected to increase in the coming years. There are many high-tech companies in the geographical area around FSU, and demand for CS graduates is high. Growth in the program is limited by the availability of adequately prepared students. The recruitment efforts are constrained by the necessity that students be not just interested in CS, but also adequately prepared for CS.

Summary of assessment model and how results are used for program improvement

Assessments and improvements of the computer science program are aligned with the recommendations of Computing Sciences Accreditation Board (CSAB) of Accreditation Board for Engineering and Technology (ABET) and Association for Computing Machinery (ACM). Assessments include both program and course level assessments. The assessment methods for program outcomes include the ETS major field test, course grades, employer survey, and graduate survey. The assessment methods for the individual courses are based on a wide range of activities; weekly quizzes, in-class activities, homework, exams, and programming assignments. Employer satisfaction surveys have been used to identify different target areas for improving the program curriculum.

Data on student placement

Most graduates of the computer science program at FSU find employment in a related field with attractive salaries or remain in school to pursue graduate degrees. Some students are even hired before they complete their degrees. A number of students obtain internships during their Junior and/or Senior year. Out of 39 graduates in the last 5 years, the faculty has been able to track 35. Of these graduates, five are pursuing graduate degrees, and the other 30 were placed in computing related positions. This is a 100% placement rate for students the faculty has been able to track.

Final recommendations approved by governing board

PROGRAM REVIEW

FAIRMONT STATE UNIVERSITY	
Program:	Bachelor of Science in Computer Science
School:	College of Science and Technology
Date:	April 1, 2013

Program Catalog Description

Computer Science is the study of the theoretical foundations of computing and their applications in computer systems. It involves the study and implementation of algorithmic processes that describe and transform information. Computer Science is intended for students with career objectives in a wide range of computing and computer-related professions, e.g., computer programmers, system analysts, software engineers, database designers, etc.

The B.S. in Computer Science at Fairmont State University has been designed to provide students with an understanding of the field that is broad enough for them to find employment in a wide spectrum of private companies or government agencies and make them competitive for graduate school and advanced study. The Computer Science program at FSU offers two majors: one in Computer Science and one in Computer Security. In addition to receiving the necessary skills in computer science, the students also receive a well-balanced general studies curriculum.

VIABILITY

Enrollments

Applicants

There are no special entrance requirements for the computer science program. The general admission requirements (http://www.fairmontstate.edu/admit/admissions-checklist) as required by FSU are enforced. The only caveat is that, to enroll in COMP-1102 *Principles of Programming I*, the student should be ready to take MATH-1112 *College Algebra*, i.e., he/she is required to have completed MATH-1100 *Intermediate Algebra* or have a Math ACT score of 21 or higher or Math SAT score 500 or higher or a Math COMPASS score of 49.

The following table lists the average High School GPA, ACT composite score, ACT math score, and ACT science score of incoming freshmen in the CS program over the past five academic years. Most of the students coming to the CS program typically have a good background in math and science. Even though the data indicates that CS freshmen are well-prepared for university level study, some of them are not ready for Calculus I (with a required ACT Math score of 23), which is the first required math class for the computer science program. Most of the incoming students are found to have prior experience using computers. Some of the students also gain some programming experience before coming to FSU.

Year	HS GPA	ACT Comp	ACT Math	ACT Science
2007-08	3.18	22.64	21.77	23.27
2008-09	2.94	22.26	21.52	22.78
2009-10	3.13	22.48	21.79	23.79
2010-11	2.81	22.47	20.94	24.29
2011-12	3.08	22.96	21.75	23.50
Average	**3.03**	**22.56**	**21.55**	**23.53**

The following table lists the number of first-time freshmen enrolled in the computer science program over the past five academic years.

Year	Computer Science	Computer Security	Total
2007-08	21	4	25
2008-09	27	3	30
2009-10	26	11	37
2010-11	15	5	20
2011-12	23	6	29

Graduates

The following table lists the number of graduates from the computer science program over the past five academic years.

Year	Computer Science	Computer Security	Total
2007-08	2	3	5
2008-09	3	2	5
2009-10	7	4	11
2010-11	2	3	5
2011-12	10	3	13

Program Courses

The following table presents the enrollment data for all computer science program courses over the past five academic years.

Course	2007-08	2008-09	2009-10	2010-11	2011-12	Total
COMP 1100 Introduction to Computing		17	59	62	81	219
COMP 1101 Applied Tech Programming	58	83	80	81	77	379
COMP 1102 Principles of Programming I	89	78	90	62	67	386
COMP 1108 Principles of Programming II	24	34	25	35	29	147
COMP 1199 Special Topics in Computer Science			2	1		3
COMP 2200 Object-Oriented Programming	19	14	21	17	23	94
COMP 2201 Machine Organization	16	17	17	19	16	85
COMP 2215 Software Design with ADA *	12					12
COMP 2220 Fundamentals of Computer Security	7	12	9	13	6	47
COMP 2230 Network Programming	5	16	16	13	17	67
COMP 2270 Data Structures	20	15	9	18	21	83
COMP 3300 Computer Graphics	5	15	11	11	9	51
COMP 3310 Artificial Intelligence	3	12	8	14		37
COMP 3340 Operating Systems	3	14	13	3	20	53
COMP 3380 Cryptography	1	6	1	6	2	16
COMP 3390 Network Security Technology		8		4	1	13
COMP 3395 Ethical Issues in Computing	7		11	3	18	39
COMP 4410 Database Management	5	10	13	10	12	50
COMP 4415 Vulnerability Assessment	5		5	2	3	15
COMP 4420 Selected Advanced Topics	4	7		12	9	32
COMP 4421 Computer Science Special Project	5	2	2	4	6	19
COMP 4440 Software Engineering			9	7	10	26
COMP 4495 Comp Security Internship	3	1	5	2	3	14
COMP 4498 Undergraduate Research			1		2	3

* Discontinued

Service Courses

Currently, two computer science courses are offered as service courses to other programs. The COMP-1101 *Applied Tech Programming* course is required for several BS and AS programs in Technology and the AS program in Information Systems Technology. The COMP-1102 *Principles of Programming I* course is required for the BS programs in Math and Math Education. On average, approximately 80 students enroll in COMP-1101 every year and 30 non-CS students enroll in COMP-1102 every year.

Course	Programs Supported	Required/ Elective
COMP 1101 Applied Tech Programming	BS in Aviation Technology	Required
	AS in Architectural Engineering Technology	Required
	BS in Architecture	Required
	AS in Electronics Engineering Technology	Required
	BS in Electronics Engineering Technology	Required
	AS in Mechanical Engineering Technology	Required
	BS in Mechanical Engineering Technology	Required
	AS in Information Systems Technology	Required
COMP 1102 Principles of Programming I	BS in Mathematics	Required
	BS in Math Education	Required
COMP 1108 Principles of Programming II	BS in Electronics Engineering Technology	Elective
	BS in Mechanical Engineering Technology	Elective
COMP 2200 Object-Oriented Programming	BS in Electronics Engineering Technology	Elective
	BS in Mechanical Engineering Technology	Elective
COMP 2201 Machine Organization	BS in Electronics Engineering Technology	Elective
	BS in Mechanical Engineering Technology	Elective

BS: Bachelor of Science AS: Associate of Science

Success Rates in Service Courses

The success rate of service courses is based on the number of students that successfully pass the course with a letter grade of D or better. The following table summarizes student success rates for the required computer science service courses as specified in the previous section. Each column depicts the number of students that successfully passed and failed the service course per academic year. The last column in the table below provides the overall % success rate for each service course. Please note that the data from Spring 2012 was not available.

Course	2007-08		2008-09		2009-10		2010-11		2011-12		%
	P	F	P	F	P	F	P	F	P	F	
COMP 1101 Applied Tech Programming	39	6	59	12	56	8	55	13	21	6	83.6
COMP 1102 Principles of Programming I	56	13	47	13	53	14	33	14	31	3	79.4

Extension Education and Off-Campus Courses

No CS course has been offered in off-campus locations in the past five years.

Cost/Student Credit Hour

Financial support for the computer science program is primarily obtained via institutional funding. There are no special fees required of students in this program. Each CS course has an associated course fee. These fees return to the College of Science and Technology. The department of Computer Science, Math, and Physics (CSMP) receives approximately $15,000 every year from that money. The CSMP department also receives approximately $3,000 for student assistants from the College of Science and Technology. The computer science program roughly gets one-third of this $6,000, but may get more if needs arise.

The cost per student credit hour data was not available for the computer science program. The cost per credit hour for the College of Science and Technology was $143.65 in 2010-11 whereas the same cost for the entire institution was $115.01. The number of majors enrolled in the computer science program was the highest (98) in 2010-11 within the College of Science and Technology and so was the total credit hours enrolled in by computer science majors (2456).

General Studies Requirements Met

The Computer Science program is in compliance with the degree definition policy of Fairmont State University. (Refer to Appendix I)

Assessment Requirements

Program outcomes have been developed with direct assessment measures. These assessment methods include the ETS major field test, course grades, employer survey, and graduate survey.

Program Outcomes	Assessment Measures
1. Identify, formulate, and solve computer science problems.	a) Surveys of program alumni and employers. b) Senior Project. c) Standardized tests.
2. Develop programs effectively in at least 3 languages under at least 2 operating systems.	a) Grades in Principles of Programming II, Object-oriented Programming, Machine Organization, and Database Management. b) Surveys of program alumni and employers. c) Standardized tests.
3. Demonstrate knowledge of the basic principles of data structures, algorithms, programming language concepts and theory, and operating systems.	a) Grades in Data Structures, Analysis of Algorithms, Automata and Language Design, and Operating Systems. b) Standardized tests.
4. Demonstrate a familiarization with computer organization, architecture, and networks.	a) Grades in Machine Organization and Network Programming.
5. Demonstrate knowledge of basic software engineering principles and be able to design, implement, and test a moderately complex software system.	a) Senior Project.
6. Learn new technologies on their own.	a) Surveys of program alumni and employers.
7. Demonstrate knowledge of core issues concerning professional, social, and ethical responsibilities in computing.	a) Grades in Ethical Issues in Computing. b) Surveys of program alumni and employers.
8. Communicate effectively orally and in writing.	a) Grades in required English, Speech, and Ethical Issues in Computing.
9. Demonstrate knowledge of differential and integral calculus, discrete mathematics, and probability and statistics.	a) Passing grade in the math courses as assigned by the Mathematics faculty.
10. Use their well-rounded education to participate in intelligent discussions of topics outside of the computer science major, with emphasis on the arts, sciences, and humanities.	a) Passing grade in the liberal studies courses. b) Surveys of program alumni and employers.

The following table summarizes student success rates for all computer science courses (lecture based) required by the majors. The success rate is based on the number of students that successfully pass the course with a letter grade of C or better. Each column depicts the percentage of students that succeeded in the course per academic year. The last column in the table below provides the overall % success rate for each course. Please note that the data from Spring 2012 was not available.

Course	**Success Rate (%)**					
	2007-08	2008-09	2009-10	2010-11	2011-12	**Overall**
COMP 1100 Introduction to Computing		66.7	83.7	68.5	80.4	**74.8**
COMP 1102 Principles of Programming I	81.2	78.3	79.1	70.2	91.2	**80.0**
COMP 1102 Principles of Programming II	71.4	75	81	64.3	57.1	**69.8**
COMP 2200 Object-Oriented Programming	58.3	60	76.5	92.9	72.2	**72**
COMP 2201 Machine Organization	61.5	73.3	87.5	82.4		**76.2**
COMP 2220 Fundamentals of Computer Security	100	100	100	91.7	100	**98.3**
COMP 2230 Network Programming	100	81.3	100	91.7		**93.3**
COMP 2270 Data Structures	64.7	91.7	75	82.4	84.2	**79.6**
COMP 3300 Computer Graphics	100	84.6	90.9	80		**88.9**
COMP 3310 Artificial Intelligence	100	81.8	100	100		**95.5**
COMP 3340 Operating Systems	100	100	100	100	94.1	**98.8**
COMP 3380 Cryptography		100	100	100	100	**100**
COMP 3390 Network Security Technology		100	100	100		**100**
COMP 3395 Ethical Issues in Computing	100		100	100		**100**
COMP 4410 Database Management	100	85.7	83.3	100	70	**87.8**
COMP 4415 Vulnerability Assessment	100		100	100	100	**100**
COMP 4420 Selected Advanced Topics	100	85.7		100		**95.2**
COMP 4440 Software Engineering			88.9	100		**94.5**

Educational Testing Service's (ETS) major field test (computer science) is administered to graduating seniors every spring. The following table summarizes the last five tests. The score range for the test is 120-200. The area subscores are the percentage of questions answered correctly for each of three areas; the areas are Programming and Software Engineering (Area#1), Discrete Structures and Algorithms (Area#2), and Systems (Architecture/Operating Systems/Networking/ Database) (Area#3)respectively. The results of 2008 and 2009 were combined in a single cohort and the results of 2010 and 2011 were combined in a single cohort. For the test administered in 2012, the mean score, area#1 subscore, area#2 subscore, and area#3 subscore were in the 42nd, 35th, 37th, and 57th percentile when compared to the national institutional averages. The national percentile is not available for the previous years.

Year	**# of Students**	**Mean**	**% Correct**		
			Area#1	**Area#2**	**Area#3**
2007-08 2008-09	10	149.9	59	33	38
2009-10 2010-11	11	149.9	59	37	39
2011-12	10	148.8	47	37	42

The ETS major field test scores was one of the driving factors for the major curriculum revision in 2009. The coverage of object-oriented programming concepts was extended by introducing a new course on object-oriented programming. New courses on software engineering, analysis of algorithms, and language design concepts were also included. The revised curriculum will address these deficiencies and the ETS test scores starting in Spring 2013 are expected to reflect the changes.

Learning outcomes have also been developed for all individual courses. The assessment methods for the individual courses are based on a wide range of activities; weekly quizzes, in-class activities, homework, exams, and programming assignments. The assessment data is being collected now.

Employer satisfaction surveys have been used to identify target areas for improving the program. Data is still being collecting for the current review cycle. The data generally indicates that the graduates receive satisfactory ratings from employers regarding their preparedness. The employer surveys influenced the major curriculum revision of Fall 2009; a capstone course was introduced where the students experience extensive teamwork and the math coursework was strengthened.

Even though no formal graduate satisfaction survey has been performed yet, informal contacts with graduates after they have several months of work experience indicates an overall satisfaction with their education. A formal graduate satisfaction survey is in the works.

Adjunct Use

The computer science program does not use any adjunct faculty.

Graduation/Retention Rates

The number of graduates from the computer science program increased from 5 in 2007 to 13 in 2011 (mean 7.8 ± 3.5). The graduation count is expected to increase in the coming years. The following table summarizes the retention and graduate rates for four freshmen classes (entering the CS program) starting Fall 2004. The last column represents the graduation rate of the freshmen who started in the CS program but eventually graduated with any FSU degree. This column implies that the CS program loses some majors to other programs. This is easily attributed to the math requirements of the CS program. As mentioned earlier, a lot of incoming freshmen do not come calculus ready and eventually they find the math hard to handle. The program faculty has recently started to intervene early and advise the at risk students according to their math needs, e.g., advising students to take MATH 1115 – *Trigonometry and Elementary Functions* if they have not taken Trigonometry in high school since it is imperative that a student is well familiar with trigonometry in order to succeed in Calculus I and subsequent math courses. One problem that exists with the early registration of freshmen is that they are advised exactly based on the model schedule, but not based on their actual math preparedness. The CS faculty is considering to get involved directly in the early registration process.

Freshman Semester	Cohort Size	Retention Rate				Graduation Rate (within 150% of Normal Time)	
		1st year	2nd year	3rd year	4th year	CS Degree	Any FSU Degree
Fall 2004	15	66.7%	40.0%	20.0%	6.7%	13.3%	46.7%
Fall 2005	13	23.1%	30.8%	23.1%	15.4%	15.4%	30.8%
Fall 2006	15	60.0%	53.3%	40.0%	20.0%	26.7%	40.0%
Fall 2007	22	45.5%	31.8%	27.3%	18.2%	18.2%	27.3%

Previous Program Review Results

The faculty involved with the teaching of computer science and computer security is in the process of significant curriculum revisions. These revisions will allow for an ABET accreditation visit. The faculty has also identified several current deficiencies in the existing curriculum via the assessments that have taken place. It is expected that these deficiencies will be addressed with the curricular changes and the implementation of a continuous improvement plan next year.

These programs of study have maintained a fairly steady enrollment over the past five years, and graduates are able to obtain positions within business and industry or continue their education within the state of West Virginia. These are indicators of a successful program. The faculty needs to address low enrolled courses, student recruitment, and retention to maintain viable programs in both computer science and computer security. The program faculty also needs to continue with the collection of assessment data on a yearly basis. The continuation of these programs is highly recommended by the Dean of the College of Science and Technology.

ADEQUACY

Program Requirements

The Computer Science major option requires 43 hours of computer science courses, 17 hours of math courses, and 14 hours of science courses (10 hours of which are counted in general studies). It requires 40 hours of general studies courses. The computer science course requirement is based on a strong programming sequence (12 hours) and advanced courses like Operating Systems, Computer Graphics, Artificial Intelligence, Ethical Issues, Database Management, Analysis of Algorithms, and Automata. A student is also required to take a Software Engineering capstone course.

The Computer Security major option requires 48 hours of computer science and computer security courses, 14 hours of math courses, and a 3-hour information systems course. It requires 38 hours of general studies courses that include 8 hours of science courses. There is an overlap of 24 hours of computer science courses between the two major options. In addition to these computer science courses, the computer security major option requires 24 hours of exclusive computer security courses, including one semester of internship. This gives the students a very strong preparedness in the security area.

A minor in computer science requires 18 hours of computer science and math courses, among which 9 hours are required and 9 hours are elective. The curriculum for the major in computer science, major in computer security, and the minor in computer science are listed in Appendix I.

General Studies	Allowed Hours	Program Hours	
		Computer Science	Computer Security
General Studies	32-42	40	38
Major	32-65	64	65
Free Electives	Minimum 21	24	25
TOTAL	Maximum 128	128	128

Faculty Data

There are four faculty members that are teaching within the computer science program. Three of them hold tenure, one holds a Ph.D. in computer science. One of the faculty members teaches one-fourth of his course load within the math program and one of them teaches half of his course load within the math program. All the CS faculty members have significant experience in teaching CS courses. Some of them are actively involved in research. They mentor undergraduate students in different research projects. They participate in professional development activities on a regular basis including attending conferences/workshops. The faculty members are dedicated and they try to ensure student success by assisting them on a one-on-one basis. There is no dependency on adjunct faculty to teach any CS course required for the degree. The faculty data is presented in Appendix II.

Accreditation/National Standards

Since the Computer Science program is planning to apply to the Accreditation Board for Engineering and Technology (ABET) for accreditation in the near future, several improvement areas in the computer science curriculum have been identified recently. A new curriculum was developed based on the ABET guidelines. This has strengthened the computer science, math, and science coursework for the students.

A computer science program advisory committee was formed in Spring 2008. As of now, the committee consists of (1) Mr. Brett Hayhurst, Software Engineering Manager, Lockheed Martin, (2) Mr. Jeff Tucker, CTO, Innovative Technology and Management Services, (3) Mr. Brian McKibben, IT Specialist, CJIS/FBI, and (4) Dr. Brian Woerner, Chair, Lane Department of Computer Science and Electrical Engineering, WVU. The plan is to include one more member from the state legislature who has some track record in technology.

In its meetings over the last five years, the committee has made several recommendations. These include (1) producing graduates with strong software development planning skills, (2) identifying the target student group and presenting the strengths of the program compared to similar programs at other institutions, (3) offering weekend and evening courses, (4) offering distance learning courses, (5) extending the coverage of object oriented programming concepts in the curriculum, (6) strengthening the math coursework, (7) availability of a larger pool of elective courses, (8) and creating a continuous improvement plan. The CS faculty has been working to implement those recommendations. The major curriculum revision of Fall 2009 implemented recommendations 1, 5, and 6. The CS faculty has been addressing recommendation 2 by participating in recruitment and retention efforts at both the university and college levels and by reaching out to the local schools. There are plans to address recommendations 3 and 4 in the future. Several elective courses have already been made available that include data mining, android programming, enterprise systems, etc. Once the complete assessment data from all courses become available, the CS faculty will start creating a continuous improvement plan.

As mentioned earlier, one of the future plans of the program is to apply for ABET accreditation. The advisory committee is expected to provide valuable advice regarding curriculum, student expectations, and the implementation of a continuous improvement plan. The committee will provide guidance in order for the Computer Science program to reflect the needs of the business, industry, and the regional community. The expertise of the members in the computing discipline will be important to the effective growth of the program.

Facilities

Several classrooms are available for priority scheduling for CS lectures. All of these classrooms provide instructional technology support. Students have access to several campus-wide computer labs. All these computers are loaded with different development software including Microsoft Visual Studio. All labs have Internet access and the students have access to the campus wireless. There are two dedicated labs for the computer science program. One of them is used as a classroom for CS courses only. The other one is dedicated for computer security majors.

The CS program has a yearly subscription for Microsoft Development software. Under this license, all students enrolled in a CS course have access to a wide collection of Microsoft Software. The computer science program also possesses a Redhat Linux server. With all these computing facilities, the students gain software development experience on multiple platforms.

The CS faculty members have their own offices equipped with modern computing facilities. The CS program moved to the reconstructed Engineering Technology (ET) Building in Fall 2008. In addition to getting access to well-equipped classrooms and faculty offices, this move also allowed for resource sharing with the Business Information System Management program located within the School of Business.

The computer science program employs a tutor every semester. The tutor is selected from a pool of CS undergraduate students. The tutor helps students with programming projects.

Strengths/Weaknesses

The computer science program at FSU emphasizes computer science concepts which enable a graduate to succeed in graduate school or a multitude of employment areas. The program is intended to provide students with the ability to adapt quickly to different programming environments and to grow into more advanced positions of employment. Students with a relatively strong high school background in problem solving fields are generally more successful than students lacking such a background. Students lacking problem solving skills must work to overcome this deficiency early in the program. Faculty have connections to both graduate schools and industry, and experience in both practical applications and theoretical studies, and are thus able to steer a student into their area of interest. The program has the advantage of being located in the High-Tech Corridor, and having a low student/instructor ratio.

The computer science program has benefitted from the collaboration with the school of business to join the IBM academic initiative program. The goal of this endeavor is to provide interested students with the opportunity to learn enterprise computing skills. To support this endeavor, the CS faculty has infused IBM technology in a few existing courses. The CS faculty has also started teaching a new course named *Intro to Enterprise Computing* that has attracted many students from both the computer science program and the school of business. This partnership has already earned several students jobs with very attractive financial packages and is expected to present more opportunities for the CS students in days to come.

One of the strengths of the CS program is to have undergraduate students involved in faculty-mentored research. This provides them with a valuable opportunity to apply the skills they learn in classrooms. Working in a research project allows them to fill the gaps in their understanding of current topics and foster their creativity. The university office of undergraduate research and the college of science and technology fund several summer undergraduate research projects every year and computer science students have earned these competitive awards on a regular basis. Many of these projects have resulted in publications at different regional, national, and international levels.

Several weaknesses in the curriculum were addressed in the revised curriculum of Fall 2009 by including courses on automata, language design concepts, algorithm analysis, and software engineering. The newly developed Software Engineering course provides the students with the experience of working on a capstone project requiring teamwork. Calculus II (integral calculus) and Statistics/Probability were also included as recommended by Association for Computing Machinery (ACM). With all these changes, the graduates will be very well prepared for either grad school or jobs in the computing industry.

Even though the program has dedicated and experienced faculty members, currently there is only one who holds a Ph.D. Also, out of the four faculty members in the CS program, one teaches one math course every semester and one teaches two math courses every semester. That leaves the program with 3.25 full time faculty members. The program should have at least one more faculty member with a Ph.D. in computer science. This will be required for ABET accreditation.

NECESSITY

Placement and Success of Graduates

The computer science program is one of the top-ranked programs in the College of Science and Technology at FSU in terms of steady student enrollment, steady graduation rate, student research, collaboration with the local High-Tech industry, and a very successful history job placement.

Students successfully completing this program gain an understanding of the concepts of computer science required for entry level software development positions. Students are able to move immediately into such positions and have the flexibility to enhance their skills. Students choosing to pursue graduate school can do so with minimal additional background course work.

Most of the program graduates find employment before they graduate. A good number of them start working on a part-time basis while they are students. Many of the graduates are employed in the local High-Tech companies in the Fairmont, Clarksburg, and Morgantown area. Some of the major employers are NASA, Lockheed Martin, Northrop Grumman, FBI, and Dominion. Starting salaries for those employed locally have ranged from $45,000-55,000 with additional benefits provided (based on informal contacts with graduates). Some graduates have moved into the Washington, D.C. area, Pittsburgh, Florida, Alabama, Illinois, and other distant places. Several graduates have also been accepted into graduate school at University of California San Diego, West Virginia University, James Madison University, University of North Carolina at Wilmington, etc. One of the recent graduates has earned accolades by receiving the first Ruby Graduate Fellowship to pursue the doctoral program at WVU.

Out of 39 graduates in the past 5 years, the faculty has been able to track 35. Of these graduates, five are pursuing graduate degrees, and the other 30 were placed in computing related positions. This is a 100% placement rate for students the faculty has been able to track.

There are many high-tech companies in the geographical area around FSU, and demand for CS graduates still remains high. This trend is expected to continue for the next several years. The table in the following page describes wages and employment trends at the national and state levels for computer science related jobs that require a bachelor degree. The data was obtained from the Bureau of Labor Statistics webpage (http://www.bls.gov/) and Occupational Information Network webpage (http://online.onetcenter.org/). The attractive wages and the increasing demand in the computing occupations are expected to have a positive impact on the computer science program at FSU.

Occupation	Median Wage (2012)		Employment (2012)		Expected Increase (2010-2020)	
	US	WV	US	WV	US	WV
Software Developers - Applications	$93,280	$81,150	586,340	540	28%	23%
Software Developers - Systems	$102,550	$70,700	391,700	1,430	32%	
Computer Programmers	$78,260	$54,750	316,790	1,110	12%	-16%
Information Security Analysts	$89,290	$49,500	72,670	100	22%	
Computer Systems Analysts	$83,800	$66,130	482,040	660	22%	10%
Database Administrators	$79,120	$54,690	111,590	370	31%	12%

Similar Programs in WV

A similar program is offered at West Virginia University. However, the program offered at that institution is oriented more toward theory, and is geared more toward preparing students for graduate school with less emphasis on application. Fairmont State University offers courses with smaller class size. Students appreciate this smaller classroom setting, since this gives them more opportunity to connect with faculty on a one-on-one basis. The CS program at FSU has great commitments to non-traditional students. The faculty members work closely with these students and strive to meet their needs. It is worth mentioning that many of FSU's students come from rural West Virginia, and they are more comfortable on this campus. Also, a good number of FSU students commute from south of Fairmont, which gives them a shorter commute distance compared to Morgantown.

According to data published by the Higher Education Policy Commission (HEPC) of West Virginia, the number of CS graduates from the entire state was 174 in 2011. This is much less than the demand. Strengthening the CS program at FSU will certainly help meet the increasing demand of software professionals in the state, particularly the High-Tech Corridor.

CONSISTENCY WITH MISSION

A central theme in the mission of FSU is to provide students with an education enabling them to be productive within their domain. Certainly computer expertise would be a significant enhancement of such an education. Students in this program are exposed to problems which might be encountered in various fields. The courses offered by the program supplement the curricula of other 4-year programs. Computer facilities are shared by students in this program with students in many of the other programs on campus. The Computer Science and *Business Information Systems Management* faculty members have been collaborating for the IBM academic initiative program. The CS faculty members interact with local High-Tech industry--an interaction that is beneficial to both.

Program of Study
BS in Computer Science
(Major in Computer Science)

<table>
<tr><th>Courses Required in Major</th><th>Total Hours</th><th>Courses Required in Related Fields</th><th>Total Hours</th></tr>
<tr><td rowspan="5">COMP 1100 Introduction to Computing (3)
COMP 1102 Principles of Programming I (3)
COMP 1108 Principles of Programming II (3)
COMP 2200 Object-Oriented Programming (3)
COMP 2201 Machine Organization (3)
COMP 2230 Network Programming (3)
COMP 2270 Data Structures (3)
COMP 3300 Computer Graphics (3)
OR
COMP 3310 Artificial Intelligence (3)
COMP 3330 Analysis of Algorithms (3)
COMP 3340 Operating Systems (3)
COMP 3395 Ethical Issues in Computing (3)
COMP 4400 Automata and Language Design (3)
COMP 4410 Database Management (3)
COMP 4440 Software Engineering (4)</td><td rowspan="5">43</td><td>MATH 1190 Calculus I (4)
MATH 3315 Calculus II (4)
MATH 2200 Mathematical Logic (3)
MATH 2216 Discrete Mathematics (3)
MATH 3335 Probability and Statistics (3)

PHYS 1105 Principles of Physics I (5) *
PHYS 1106 Principles of Physics II (5) *
CHEM 1101 General Chemistry I (4)
OR
BIOL 1105 Biological Principles I (4)
OR
SCIE XXXX Any course (4)

* Hours counted in General Studies</td><td>21</td></tr>
<tr><td>General Studies</td><td>Total Hours</td></tr>
<tr><td><u>First Year Experience</u>
ENGL 1104 Written English I (3)
ENGL 1108 Written English II (3)
COMM 2200 Intro to Human Communication (3)

<u>Scientific Discovery</u>
PHYS 1105 Principles of Physics I (5)
PHYS 1106 Principles of Physics II (5)

Cultural/Civilization Exploration (9)
Artistic/Creative Expression (6)
Society/Human Interactions (6)</td><td>40</td></tr>
<tr><td>Free Electives</td><td>Total Hours</td></tr>
<tr><td></td><td>24</td></tr>
</table>

Total for Degree: 128 Hours

Professional society that may have influenced the program offering and requirements:

Association for Computing Machineries (ACM)
Institute of Electrical and Electronic Engineers (IEEE)

Program of Study
BS in Computer Science
(Major in Computer Security)

Courses Required in Major	Total Hours	Courses Required in Related Fields	Total Hours
COMP 1100 Introduction to Computing (3) COMP 1102 Principles of Programming I (3) COMP 1108 Principles of Programming II (3) COMP 2200 Object-Oriented Programming (3) COMP 2201 Machine Organization (3) COMP 2220 Fundamentals of Computer Security (3) COMP 2230 Network Programming (3) COMP 2270 Data Structures (3) COMP 3340 Operating Systems (3) COMP 3380 Cryptography (4) COMP 3390 Network Security Technology (4) COMP 3395 Ethical Issues in Computing (3) COMP 4410 Database Management (3) COMP 4415 Vulnerability Assessment (4) COMP 4495 Computer Security Internship (3)	**48**	MATH 1170 Intro to Mathematical Analysis (4) MATH 1190 Calculus I (4) MATH 2200 Mathematical Logic (3) MATH 2216 Discrete Mathematics (3) INFO 2250 Networking Fundamentals (3)	**17**
		General Studies	**Total Hours**
		First Year Experience ENGL 1104 Written English I (3) ENGL 1108 Written English II (3) COMM 2200 Intro to Human Communication (3) Scientific Discovery (8) Cultural/Civilization Exploration (9) Artistic/Creative Expression (6) Society/Human Interactions (6)	**38**
		Free Electives	**Total Hours**
			25

Total for Degree: 128 Hours

Professional society that may have influenced the program offering and requirements:

Association for Computing Machineries (ACM)
Institute of Electrical and Electronic Engineers (IEEE)

Program of Study
Minor in Computer Science

Required Courses (9 Hours)

COMP 1102 Principles of Programming I (3)
COMP 1108 Principles of Programming II (3)
COMP 2200 Object-Oriented Programming (3)

Elective Courses (9 Hours)

COMP 2201 Machine Organization (3)
COMP 2220 Fundamentals of Computer Security (3)
COMP 2230 Network Programming (3)
COMP 2270 Data Structures (3)
COMP 3300 Computer Graphics (3)
COMP 3395 Ethical Issues in Computing (3)
COMP 4440 Software Engineering (4)
MATH 2216 Introduction to Discrete Mathematics (3)

Total Hours: 19

Appendix II **Faculty Data – Randall Baker**

Name Randall Baker Rank Assistant Professor

Full-time X Part-time ____ Adjunct ____ Graduate Asst. ____

Highest Degree Earned M.S. in Mathematics Date Degree Received August, 2005

Conferred by West Virginia University

Area of Specialization Computer Graphics, Applied Mathematics, Combinatorics, Numerical Analysis

Professional registration/licensure ____ Years of employment at present institution 22

Years of employment in higher education 23 Years of related experience outside higher education 1

Non-teaching experience 1

(a) Courses taught in the last two years:

Year/Semester	Course Number & Title	Enrollment
2010 / Fall	COMP 1102 – Principles of Programming I	13
2010 / Fall	COMP 1108 – Principles of Programming II	14
2010 / Fall	MATH 1107 – Fundamental Concept of Mathematics	31
2010 / Fall	MATH 1185 – Applied Calculus I	15
2011 / Spring	COMP 1102 – Principles of Programming I	20
2011 / Spring	COMP 3300 – Computer Graphics	11
2011 / Spring	MATH 1112 – College Algebra	20
2011 / Spring	MATH 4401 – Differential Equations	8
2011 / Fall	COMP 1102 – Principles of Programming I	22
2011 / Fall	COMP 1108 – Principles of Programming II	8
2011 / Fall	MATH 1101 – Applied Technical Mathematics I	26
2011 / Fall	MATH 1185 – Applied Calculus I	11
2012 / Spring	COMP 1102 – Principles of Programming I	22
2012 / Spring	COMP 3300 – Computer Graphics	9
2012 / Spring	MATH 1185 – Applied Calculus I	23
2012 / Spring	MATH 3391 – Real Analysis	14

(b) Professional development activities during the last five years:

- Participated in 8 hours of workshops at FSU, August 2007.
- Attended the 35th annual Mathematics & Statistics Conference at Miami University, "Number Theory", Sept. 28-29, 2007.
- Participated in the annual meeting of the West Virginia Mathematical Association of Two Year Colleges (WVMATYC), April 2009
- Participated in online workshop offered by Wolfram Research: "What's New in Mathematica 8", Fall 2010.
- Participated in online workshop: "Topic in First Year Calculus", Wolfram Research, Spring 2011
- Attended a Blackboard seminar, April 2012.

(c) Awards/honors or special recognition in last five years: None

(d) Activities that have contributed to effective teaching:

As the field of computer science is constantly changing, I do a significant amount of reading and independent study for my COMP courses. This is especially the case for COMP 3300, as computer graphics uses ever more powerful technology and advanced algorithms. I created new course materials for MATH 2212, MATH 3342, and MATH 3391, as I taught each of those for the first time. Also, I have developed several lab activities for MATH 1185.

(e) Professional books/papers published during the last five years: None

(f) Externally funded research (grants and contracts) during last five years. None

Appendix II **Faculty Data – Mahmood Hossain**

Name Mahmood Hossain Rank Associate Professor

Full-time X Part-time ____ Adjunct ____ Graduate Asst. ____

Highest Degree Earned Ph.D. in Computer Science Date Degree Received December, 2006

Conferred by Mississippi State University

Area of Specialization Data Mining, Database Systems, Artificial Intelligence

Professional registration/licensure ____ Years of employment at present institution 7

Years of employment in higher education 15 Years of related experience outside higher education 1

Non-teaching experience 1

(a) Courses taught in the last two years:

Year/Semester	Course Number & Title	Enrollment
2010 / Fall	COMP 1101 – Applied Tech Programming	22
2010 / Fall	COMP 1101 – Applied Tech Programming	23
2010 / Fall	COMP 1199 – Special Topics	1
2010 / Fall	COMP 2270 – Data Structures	18
2010 / Fall	COMP 4410 – Database Management	10
2011 / Spring	COMP 1101 – Applied Tech Programming	17
2011 / Spring	COMP 1101 – Applied Tech Programming	19
2011 / Spring	COMP 1102 – Principles of Programming II	21
2011 / Spring	COMP 3310 – Artificial Intelligence	14
2011 / Fall	COMP 1101 – Applied Tech Programming	10
2011 / Fall	COMP 1101 – Applied Tech Programming	22
2011 / Fall	COMP 1108 – Data Structures	21
2011 / Fall	COMP 4410 – Database Management	11
2011 / Fall	COMP 4498 – Undergraduate Research	1
2012 / Spring	COMP 1101 – Applied Tech Programming	21
2012 / Spring	COMP 1101 – Applied Tech Programming	24
2012 / Spring	COMP 1102 – Principles of Programming II	21
2012 / Spring	COMP 3310 – Advanced Topics (Data Mining)	9
2012 / Summer	COMP 4410 – Database Management	1
2012 / Summer	COMP 4421 – Special Project	1

(b) Professional development activities during the last five years:

- Attended IBM Enterprise Systems Faculty Training Session, 2012.
- Attended IBM Academic Initiative Professor Seminar, Summer 2011.
- Served as mentors in several undergraduate research projects.
- Presented at C3S2E 2012, KDD 2011, WorldComp 2011, ISOneWorld 2011, IHI 2010, WVAS Meeting 2009, WVAS Meeting 2008, CCSCE 2008, and IRI 2007.
- Chaired sessions at ICAI 2011, IKE 2011, CCSCNE 2010, and IRI 2007.

- Reviewed research papers for SIGCSE 2012, SIGCSE 2011, SIGCSE 2010, SIGCSE 2009, CCSCMW 2009, and ITiCSE 2009.
- Participated in a one-week online workshop on "Understanding the Needs of the Adult Learner" at University of Maryland University College, 2010.
- Participated in a five-week online training course for teaching online courses at University of Maryland University College, 2009.
- Attended ABET faculty workshop on assessing program outcomes, 2008.

(c) Awards/honors or special recognition in last five years:

- Tenured and promoted to Associate Professor, 2012.
- Summer undergradute research grant, 2012.
- Summer undergradute research grant, 2011.
- Summer undergradute research grant, 2010.
- Summer undergradute research grant, 2009.
- FSU Research Enhancement Grant, 2007.

(d) Activities that have contributed to effective teaching:

- Designed and taught a new course *COMP 3330 Analysis of Algorithms*.
- Utilizing active learning in teaching programming courses.
- Undergraduate research mentorship
- Attending and presenting at conferences on a regular basis.

(e) Professional books/papers published during the last five years:

- M. Hossain, S. Bridges, Y. Wang, and J. Hodges. An effective ensemble method for hierarchical clustering. *Proc. of International C* Conference on Computer Science & Software Engineering, Montreal, Jun 27-29, 2012*, pages 18-26.
- T. Devine, M. Hossain, E. Harvey, and A. Baur. Improving pedagogy by analyzing relevance and dependency of course learning outcomes. *Proc. of KDD Workshop on Knowledge Discovery in Educational Data, San Diego, Aug 21, 2011*, pages 73-80.
- M. Sink, M. Hossain, and T. Kato. Non-linear analysis of psychophysiological effects of auditory stimuli using fractal mining. *Proc. of International Conference on Scientific Computing, Las Vegas, Jul 18-21, 2011*, pages 271-275.
- M. Hossain, S. Bridges, Y. Wang, and J. Hodges. A mutually supervised ensemble approach for clustering heterogeneous datasets. *Proc. of International Conference on Information and Knowledge Engineering, Las Vegas, Jul 18-21, 2011*, pages 397-403.
- C. Lee, R. Giorcelli, and M. Hossain. Factors influencing the virtual group participation. *Proc. of Annual ISOneWorld Conference, Las Vegas, 2011*, May 4-6.
- A. Saas, M. Hossain, and C. Lee. Development of a software tool for healthcare data interchange. *Proc. of ACM International Health Informatics Symposium, Arlington, VA, Nov 11 - 12, 2010,* pages 517-520.
- M. Hossain, S. Bridges, Y. Wang, and J. Hodges. Extracting partitional clusters from heterogeneous datasets using mutual entropy. *Proc. of IEEE International Conference on Information Reuse and Integration, Las Vegas, Aug 13-15, 2007*, pages 447-454.

(f) Externally funded research (grants and contracts) during last five years. None

Appendix II **Faculty Data – Theodore LaRue**

Name Theodore LaRue Rank Assistant Professor

Full-time X Part-time ____ Adjunct ____ Graduate Asst. ____

Highest Degree Earned M.S. in Mathematics Date Degree Received January, 1982

Conferred by West Virginia University

Area of Specialization Object-oriented Programming, Software Design, Mathematics

Professional registration/licensure ____ Years of employment at present institution 31

Years of employment in higher education 31 Years of related experience outside higher education ____

Non-teaching experience ____

(a) Courses taught in the last two years:

Year/Semester	Course Number & Title	Enrollment
2010 / Fall	COMP 1100 - Introduction to Computing	34
2010 / Fall	COMP 1102 - Principles of Programming I	20
2010 / Fall	COMP 2200 - Object Oriented Programming	17
2010 / Fall	COMP 4421 - Special Project	4
2010 / Fall	MATH 1112 - College Algebra	32
2011 / Spring	COMP 1100 - Introduction to Computing	28
2011 / Spring	COMP 2201 - Machine Organization	19
2011 / Spring	COMP 2230 - Network Programming	13
2011 / Spring	MATH 1112 - College Algebra	12
2011 / Fall	COMP 1100 - Introduction to Computing	26
2011 / Fall	COMP 1102 - Principles of Programming I	23
2011 / Fall	COMP 2200 - Object Oriented Programming	23
2011 / Fall	COMP 4421 - Special Project	3
2011 / Fall	MATH 1112 - College Algebra	32
2012 / Spring	COMP 1100 - Introduction to Computing	31
2012 / Spring	COMP 2201 - Machine Organization	16
2012 / Spring	COMP 2230 - Network Programming	17
2012 / Spring	MATH 1112 - College Algebra	29
2012 / Spring	MATH 1112 - College Algebra	28

(b) Professional development activities during the last five years:

- Developed Java application for practicing vocabulary for GRE preparation.
- Improved efficiency for a complex machine control program for a sawmill.
- Developed Java application for maintaining and viewing scaled grades.

(c) Awards/honors or special recognition in last five years: None

(d) Activities that have contributed to effective teaching:

Reading current literature and experimenting with new languages and other new software; building microcontroller circuits.

(e) Professional books/papers published during the last five years: None

(f) Externally funded research (grants and contracts) during last five years. None

Appendix II **Faculty Data – Donald Tobin**

Name Donald L. Tobin Jr. Rank Assistant Professor

Full-time X Part-time ____ Adjunct ____ Graduate Asst. ____

Highest Degree Earned M.S. in Computer Science Date Degree Received 1987

Conferred by Boston University

Area of Specialization Computer Security, Artificial Intelligence, Systems, Systems Dev. and Testing

Professional registration/licensure ____ Years of employment at present institution 10

Years of employment in higher education 15 Years of related experience outside higher education 17

Non-teaching experience 17

(a) Courses taught in the last two years:

Year/Semester	Course Number & Title	Enrollment
2010 / Fall	COMP 1102 – Principles of Programming I	9
2010 / Fall	COMP 2220 – Fundamentals of Computer Security	13
2010 / Fall	COMP 3340 – Operating Systems	3
2010 / Fall	COMP 3380 – Cryptography	6
2011 / Spring	COMP 3390 – Network Security Technology	4
2011 / Spring	COMP 3395 – Ethical Issues in Computing	3
2011 / Spring	COMP 4415 – Vulnerability Assessment	2
2011 / Spring	COMP 4420 – Advanced Topics	12
2011 / Spring	COMP 4440 – Software Engineering	7
2011 / Spring	COMP 4495 – Computer Security Internship	2
2011 / Fall	COMP 1100 – Introduction to Computing	24
2011 / Fall	COMP 2220 – Fundamentals of Computer Security	6
2011 / Fall	COMP 3340 – Operating Systems	20
2011 / Fall	COMP 4415 – Vulnerability Assessment	2
2011 / Fall	COMP 4495 – Computer Security Internship	2
2012 / Spring	COMP 3380 – Cryptography	1
2012 / Spring	COMP 3395 – Ethical Issues in Computing	18
2012 / Spring	COMP 4440 – Software Engineering	10
2012 / Spring	TECH 2299 – Intro to Enterprise Systems	35
2012 / Summer	COMP 3380 – Cryptography	1
2012 / Summer	COMP 3390 – Network Security Technology	1
2012 / Summer	COMP 4415 – Vulnerability Assessment	1
2012 / Summer	COMP 4495 – Computer Security Internship	1

(b) Professional development activities during the last five years:

- *Undergraduate Research Mentor*
- *Regional Conference Involvement*

(c) Awards/honors or special recognition in last five years:

- Frequent invited speaker at various local middle schools, high schools, and Catholic schools in the area on various topics on the social aspects of modern computing including internet safety and awareness of online reputations.
- Invited Speaker to the 2008 Conference of West Virginia Catholic School teachers (2008)

(d) Activities that have contributed to effective teaching:

- Undergraduate Research Mentorship

(e) Professional books/papers published during the last five years:

(f) Externally funded research (grants and contracts) during last five years.

Mr. Jeff Tucker
Chief Technical Officer
Innovative Technology and Management Services, Fairmont

Overall from an industry perspective I have been pleased with the computer science students we receive from Fairmont State. If I had one comment it would be that we need more graduates. The high-tech area here in North Central WV has a high demand for computer professionals and we still find the need to recruit from outside the state in order to fill our openings. I think Fairmont State has a real opportunity to market and grow their Computer Science program given the demand in this part of WV. If there is a discouraging comment to be made in regards to the numbers presented in the report it is the low number of graduates. So I started looking at the number of students enrolling as freshman and the number of graduates listed in the 4 to 5 year period after enrollment and the retention rate within the Computer Science program appears to be low. This may be a trend across Computer Science programs but in one part of the report there is mention that students are not prepared to enter the Computer Science program. There is also a perception issue with college students regarding math and often programs with high math requirements turn students off. I feel that maybe some upfront work advising students or informing students about the need for the math requirements and how they integrate with the computer science curriculum might be helpful. I also might recommend looking at the student advising program to help students that might decide to change majors or drop out of the computer science program. Possibly utilizing peer mentors or even industry mentors might help students realize the need to stay in the program.

Overall I think the course structure appears to fit well with computer science programs that I see from other job applicants that we interview. Once recommendation that I might make is that the salary data listed in the report are blended rates. For example computer programmers often have levels. A Junior level programmer is usually entry-level and then the employee will move to mid-level and then senior level programmer. The salaries you have listed in your report are a blend of these. However, we often interview students that have a perception that they should be starting at these salary levels. This often makes it hard for job applicants to understand that they will be paid according to experience and years of service.

I like the fact that the program is starting to incorporate IBM into the curriculum and I would also recommend looking at some other vendors that might have similar educational programs. Possibly Oracle, Cisco, and even some open source software like Fedora Linux. Technology is changing at a rapid pace especially in the area of software development. I hope that the push for ABET certification will still allow Fairmont State the flexibility to make adjustments to their program in an agile and timely manner. The need for more computer science graduates is something that I know my company would like to see and I am sure others in this area as well. However, I fear that only turning out 8-10 graduates a year is something of a concern. It seems from the review that the program struggles trying to figure out what they want to focus on. Is the program trying to prepare students for graduate school or the workforce. I also did not see much mention of the program supporting any type of undergraduate research in the areas of computer science. I would think with the strong focus on math within the program there would be a strong opportunity to look at algorithm research and development or even look at integrating some CS research with other disciplines within the university like health care, physical sciences, and even data analytics.

From an industry perspective we need the Fairmont State Computer Science program and will continue to hire your graduates. We have a large percentage of our current workforce that are Fairmont State alumni and we are more than pleased with the quality of student that Fairmont State has provided the local community.

Mr. Brian McKibben
IT Specialist
Criminal Justice Information Services Division
Federal Bureau of Investigation, Clarksburg

I am overall encouraged by the 2009 changes to the program. It is also exciting that you are having students work in a virtualized environment.

As a follow-up to the virtualized environment, I have a further suggestion: in my world (networking), I interact with many programmers who really don't understand basic networking on a large scale. The differences between LANs, WANs, upload versus download, bandwidth versus latency, expectations of applications of firewall administrators. These things seem to be lacking in many of the developers I interact with. I don't think the network programming class fully embraces some of the pragmatic aspects of networking.

It is encouraging that the CS program at FSU has been carried to local employees (including employees of FBI) to further their education. In order to show more commitment to non-traditional students, weekend and night classes should be made available.