

Institution:

University of Maryland of Eastern Shore

Academic unit:

Department of Mathematics and Computer Science

School of Business and Technology

Program(s) reviewed:

Computer Science and Applied Computer Science

Year in which the review process was Completed and Names(s) of External Reviewer(s): 2014

Tony Moore - Vice President of Information and Technology Management  
Southern University and A&M College

Enrollments and Degrees Awarded for Each of the Past Five Years in This Program:

Name of Major	Academic Yr 2009-10	Academic Yr 2010-11	Academic Yr 2011-12	Academic Yr 2012-13	Academic Yr 2013-14
CS Enrollment	114	120	119	124	142
Degrees Awarded	8	7	2	5	13

Name of Major	Academic Yr 2009-10	Academic Yr 2010-11	Academic Yr 2011-12	Academic Yr 2012-13	Academic Yr 2013-14
APCS Enrollment	46	46	30	18	12
Degrees Awarded	9	10	16	9	2

Summary of the **INTERNAL AND EXTERNAL REVIEW**: (Include major findings and recommendations for action. For external reviews associated with regional or programmatic accreditation, please indicate accrediting group and context in which the review occurred.)

### **OVERVIEW**

The School of Business and Technology intends to review each of its programs in an on-going cycle. These periodic reviews enable the School to update its curriculum and address any problems that may occur or have occurred. Since the primary emphasis of the Math and Computer Science Department is on improving student learning and performance, the process must be continuous. Further, the awareness of the accountability of programs in meeting the changing needs of students, faculty, staff and the external publics of the School will be enhanced by the review process.

The Department of Mathematics and Computer Science seeks to:

- Attract and retain students in Departmental programs by providing current and challenging curricula, effective advisement, and innovative instructional strategies;
- Attract and retain well qualified faculty dedicated to preparing students, both academically and socially, to be competitive in the global workforce environment;
- Develop and implement up-to-date curricula that provides a balance between theory and practice;
- Develop and maintain up-to-date computing facilities and other learning/instructional environments;
- Provide co-curricular opportunities for students via participation in faculty/student research projects, student programming and design competitions, professional or student organizations, and pre-professional internships;
- Encourage undergraduate and graduate students to participate in inter-disciplinary research activities and industry-funded design projects;
- Develop and maintain mutual cooperation and partnerships with area industries.

**Computer Resources:** Students in both undergraduate and graduate degree programs benefit from the wide variety of computing resources made available at the University of Maryland Eastern Shore. Both Unix-based and Windows-based systems provide rich computing environments both for majors as well as students in service courses. The Department has two Computer Laboratories equipped with 35 Windows based Intel I7 64 bit workstations. To assist students in service courses in mathematics, the Department has a Mediated Learning Laboratory that provides online tutoring, homework, quizzes, and test preparation materials. In addition, students have several other campus computer facilities available to complete required coursework.

The External review of the computing programs affirms that the programs are producing quality graduates ready to enter graduate study in computer science or related disciplines or ready to perform analytical, modeling, and computational task in industrial, scientific, or business settings. The department faculty provides a wide range of expertise in computer science, information systems, computer engineering and mathematics. The Department has faculty expertise in essential areas of computer science. In addition, the Department has adequate computing environments to assist in the completion of intense computing activities. Other strengths highlighted in the external review of note are: (1) clear and distinctive degree programs preparing students for specialized functions in the workforce or further study in graduate school; (2) collaborative efforts with industry leaders such as IBM that have resulted in unique curricular components in enterprise computing and enterprise software/hardware testing.

Suggestions and recommendations center on increasing the number of faculty with masters or Ph.D. degrees in computer science and related disciplines, securing external grants to support research activities for both faculty and students, and adding courses, tracks, or certificate programs that expose students to newly emerging applications in computer science.

### **Summary of Internal and External Reviews:**

The Department of Mathematics and Computer Science prepared the Self-Study from the template provided through the Academic Program Review process through the University System of Maryland. Dr. Robert Johnson, Jr., Ph.D. forwarded the report that described the various areas of expertise of faculty, program enrollment and graduation data, departmental resources, etc.

In reviewing the Departmental Questionnaire, course syllabi, and interview notes, the reviewer determined that the Department of Mathematics and Computer Science is educating and producing quality graduates in the computing disciplines. These graduates are able to enter the computing workforce or continue study at the graduate school level. The review has revealed a number of rare or unique characteristics that potentially give students an advantage in certain areas of the computer science workplace, particularly in enterprise computing.

In particular, program strengths include:

1. Two distinctive baccalaureate programs clearly giving students the awareness and opportunity to focus their training to computer science tools needed for business or industrial settings as opposed to scientific applications;
2. The Master of Science in Applied Computer Science gives students advanced database applications, computer networking, and software engineering courses and activities that are sought after in industrial, educational, and research environments;
3. Course syllabi are clear, informative, and are resources for students with regards to course content, academic expectations, and resources needed;
4. All advanced courses in computer science are taught by faculty with terminal degrees possessing a wide range of expertise;
5. The collaborative efforts with IBM staffers to develop curricular components in

mainframe computing gives students additional employment opportunities with IBM customers such as Bank of America, Depository Trust and Clearing Corporation, IRS, and other companies with mainframe computing environments;

6. The Department developed, in collaboration with IBM, the pilot course CSDP 188 Enterprise Hardware/Software Testing potentially attracting online enrollees worldwide;
7. The CSDP 490 Senior Design Project course exposes students to identification of the problem, design of solutions, implementation and testing, and product presentation, similar to activities required of computer science personnel in the workforce;
8. The program has continued with course offerings in COBOL, attractive to companies with computing environments running applications written in the widely used language;
9. The Department is piloting a number of computer science and mathematics redesign concepts such as the supplemental model, peer learning, infusion of modern technology in instruction, and adding homework laboratories to student weekly schedules;
10. Each student is assigned a faculty advisor and are required to make regular appointments for course enrollment, course withdrawals, degree progress and audit, internship search, and graduate school or employment search and application processes;
11. The faculty have undertaken a serious effort in grant proposal writing to secure external funds to provide tutorial services, computational software, and resources for faculty/student research activities;
12. The Department has two Computer Laboratories equipped with 35 Windows based Intel I7 64 bit workstations;
13. To assist students in service courses in mathematics, the Department has a Mediated Learning Laboratory that provides online tutoring, homework, quizzes, and test preparation materials;
14. Department has exclusive use of an IBM mainframe in Dallas, Texas. This machine can be accessed remotely from any PC on campus can support many users simultaneously, and is used to teach UNIX-based and Enterprise Computing courses.

### **Specific Recommendations from the External Examiner**

1. The University needs to allocate at least 4 new faculty lines to fully staff the Department. The Department has an enrollment goal of 200 undergraduate and 50

graduate students. Given that the desired student/faculty ratio is approximately 20:1, then the Department needs at least of total of 10-11 full-time faculty members;

2. Faculty should engage in grant proposal writing to support faculty/student research activities, provide scholarship aid to high-achieving students, support release time for faculty for long-range planning, and conference participation and attendance;
3. The Department should add courses or activities that emphasize emerging needs and research in computing. There is a number of computing needs in critical areas such as information assurance, risk management, business logic, system auditing, etc. The Department should consider offering certificate programs in such high demand areas such Cybersecurity, Project Management, ITIL Infrastructure Library, and Information Security;
4. The Department should consider creating a concentration in Enterprise/Mainframe computing, as there remains a significant need for personnel to manage computing environments in large companies.

Departmental/college/institutional action plan for addressing recommendations, including mechanisms for following up and assessing progress:

#### **A) Department's Response/Plan for Addressing Recommendations**

1. The Department has recently submitted Budget and Enhancement Request that lists the need to appoint 2 or more faculty members possessing masters or Ph.D. degrees in Computer Science or related disciplines. Tenure Track position advertisements were done during the 2013-14 academic year and resulted in hiring one person possessing a Ph.D. in computer science. Plans now are to advertise for a second appointment during the 2014-15 academic year;
2. The Department Chair has established, for the 2014-15 academic year, the Grants and External Support Departmental committee charge with identifying potential external request for proposals that would support research, provide scholarship aid to high-achieving students, support release time for faculty for long-range planning, and conference participation and attendance;
3. The Curriculum Committee will be charged with identifying additional program strengths, needs, and curricular opportunities. Particular attention will be paid to these emerging interdisciplinary areas in computer science. A report on their findings will be required during the December 2014 faculty meetings;
4. Currently, two faculty members involved in the delivery of the enterprise themed courses are now reviewing enterprise computing curricula at-Marist University, Syracuse University, and West Texas A&M University, considered leaders in enterprise computing education. The curriculum committee will then develop a recommended course sequence for review and

adoption by IBM consultants and Departmental faculty.

**B) Mechanisms for following up and Assessing Progress:**

The Department of Mathematics and Computer Science will charge the Assessment Committee in September 2014 with the task of monitoring and reporting on the progress that the Department has made toward the recommendations of the external reviewer.

**Conclusion**

The computer science programs are producing graduates that are competitive and are finding opportunities for employment as well as further graduate study in computer science and other areas.

Submitted by:

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