

Assessment Report

Computer Science

**College of Information Technology and
Engineering**

December 2011



MARSHALL UNIVERSITY

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Marshall University

I CONSISTENCY WITH UNIVERSITY MISSION

The Computer Science program strives for excellence in creating, applying and imparting knowledge towards student advancement through intellectually challenging curriculum, scholarly research and publications in collaboration with industry and government for the advancement of computing sciences and service to the university, community, and the profession.

The program's teaching mission realizes the need of human capital in the rapidly changing technology in the field and aims to imbue graduates with strong problem solving expertise, astute critical thinking, technical proficiency, ethical decision making and effective communication skills as individuals, as members of multidisciplinary teams, and ultimately as team leaders with an awareness of the cultural, social, legal and ethical issues inherent in the discipline of computer science.

The pursuit of scholarly research, publications and scholarship in computer science from both faculty and students is integral to create a balanced and well rounded individual with mastery of the fundamentals and practical skills that will continuously pursue the creation of scientific knowledge and practical technology as part of lifelong learning.

The program recognizes the responsibility to support the discipline, the university and society through faculty contribution in professional organizations, sponsorship of student organizations and participation in various service-learning projects and activities.

In support of Marshall University's mission:

The computer science program recognizes the importance of reflecting Marshall University's mission in the courses and in student development. The program entails a maximum and thorough development of each student's potential in Computer Science through various educational innovations and programs that utilize knowledge, creativity and critical thinking skills through various activities in and out of the classroom. Computer Science students are given ample opportunities to be involved in software development projects, research projects, and/or internships as part of their learning experience. The program is also committed on advancing educational innovations that will expand and elevate intellectual resources of the state and region through an assortment of activities and extensive course offerings.

Computer Science faculty have remained current in their field through extensive participation in research projects, prolific scholarly activities and various appointments as professional consultants. The faculties have constantly engaged students' critical thinking, problem solving and adaptive skills through curriculum and course adjustment throughout the academic year.

II Program's Student Learning Outcomes

See column one in the chart below.

III. Assessment Activities

See the chart below.

Program Level				
Program's Student Learning Outcomes	Assessment Measures (Tools)	Standards/Benchmark	Results/Analysis	Analysis/Planned Action
1. The student will have the background necessary to pursue advanced degrees or a career in industry	1. A. The faculty will review the curriculum annually in terms of Computer Science curriculum guidelines.	1.A. The curriculum should adhere to the Computer Science degree program guidelines published by the Association for Computing Machinery (ACM).	1.A. There should be a greater emphasis on ethics throughout the curriculum.	1. A. The faculty will continue to monitor the ACM guidelines for changes.
	1.B. The curriculum will be reviewed annually to ensure that the course offerings and content are relevant and up-to-date in the rapidly changing field of Computer Science.	1. B. There are no standards or benchmarks therefore the faculty must identify trends in academia and industry regarding activities related to Computer Science.	1.B. A special topics course on Parallel Computing was offered in the Spring of 2011. A special topics course on XML Technologies was offered in the Fall of 2011.	1. B. Two special topics courses will be offered in the Spring of 2012 (Parallel Programming and Data Mining). At least one elective will be offered in the Fall of 2012.

	<p>1. C. The curriculum will be reviewed annually to ensure that the course offerings and content provide the student with a solid foundation in core Computer Science courses.</p>	<p>1. C. While formal benchmarks have yet to be identified, the faculty can evaluate the curriculum based on overall student performance in core areas of Computer Science.</p>	<p>1. C. Several topics currently covered in CS305 – Software Engineering I and CS310 – Software Engineering II need to be distributed across the three introductory Computer Science courses so that the students receive exposure to these important topics over three semesters on a more continual basis.</p> <p>The students need more exposure to formal Computer Science theory.</p> <p>We are now offering a required course in Advanced Algorithm Analysis and Design. This will provide students with additional instruction and experience in Algorithm Analysis and Design.</p>	<p>1. C. Beginning in the Fall of 2012, CS305 and CS310 will be consolidated into a single CS305 offering and the remaining topics will be distributed across CS110 – Computer Science I, CS120 – Computer Science II, and CS210 – Algorithm Analysis and Design.</p> <p>Beginning the Spring of 2013, a new course in Automata Theory will be offered.</p>
	<p>1.D. Course content and pedagogy will be reviewed and adjusted after each semester the course is offered based on student feedback.</p>	<p>1.D. Course instructors will review the Course Evaluation results provided by the University and will review and discuss effective and ineffective course changes implemented in the prior semester.</p>	<p>1. D. Each course could use improvement.</p>	<p>1. D. Course pedagogy and content will be adjusted each semester, as required.</p>

	1. D. The faculty and department chair will review the equipment that is available to the students and instructors.	1.D. There are no published standards or benchmarks therefore the faculty and department chair will assess the equipment based on current trends and departmental budgetary constraints.	1. D. The computers in the two Computer Science Labs were replaced with current models in the Summer of 2010. The new machines have CUDA-capable graphics cards, monitors with increased resolution and surface area, and more main memory.	1. D. None required.
2. The student will demonstrate mastery of CS and have broad understanding of computing at all levels of abstraction.	2.A. Capstone project class	2.A. The program assess students' ability on problem analysis, research design and experimentation, combined with an understanding and appreciation of data structures, advanced programming, algorithms and software engineering.	2.A. Senior Projects were revamped so they include specific target dates and objectives along with the assignment of an individual faculty as a project advisor to supervise and monitor progress. Senior projects are also geared towards undergraduate research and scholarly projects.	2.A. None required.
	2.B. Course exams, programming lab, programming assignments, and class projects that	2.B. Test students' ability analyze a problem, develop a programming solution to it, code and execute the program, test, interpret and experiment with results.	2.B. The students have demonstrated proficiency on computing skills although each student have their own strength and weaknesses.	2.B. Several courses are being redesigned to provide more challenging hands-on practice of various CS subjects
3. The student will design, analyze, and apply algorithms.	3.A. Test grades, in-class, programming assignments, and programming project.	3.A. There are no set of standards on how to assess an individual's ability to design, analyze and apply algorithms.	3.A. There is now an increased emphasis on Data Structures in CS120 - Introduction to Computer Science II.	3.A. None required.

	3.B. Semester long class projects	3.B. Students are evaluated on the development of an algorithm that will solve a given open ended problem and the implementation of the computational solution in relation to the algorithm effectiveness and efficiency.	3.B. A required course, CS215 - Advanced Algorithm Analysis and Design, is being offered in the Spring of 2012.	3.B. None required.
4. The student will analyze and implement a large-scale and significant project as team member or individual contributor	4. The student will plan and execute a comprehensive project.	4. Each student will demonstrate this outcome by passing CS490 – Senior Project I and CS490 – Senior Project II	4. All CS graduating students who completed their projects achieved this level of performance.	4. Continue to assess how we can continually improve the CS490/491 Senior Project experience for the student.
5. The student will demonstrate the ability to communicate effectively through written assignments and through public speaking presentations	5.A. Written assignments in CS305 – Software Engineering I and CS310 – Software Engineering II	5.A. Students will average at least 85% on all written assignments in CS305 and CS310.	5.A. Students have averaged at least 85% on all written assignments in CS305 and CS310.	5.A. This results is satisfying and we will continue to emphasize good writing skills through these assignments.
	5.B. Research report and presentation in CS330 – Operating Systems	5.B. Students will receive a grade of C or better on the written and orally presented research report for CS330.	5.B. All students received a grade of C or better on the written and orally presented research report for CS330. We have instituted a pair of rubrics to evaluate the research reports and presentations. These were made available to the students when the reports and presentations were assigned.	5. B. The students seemed to appreciate having these rubrics.

	5.C. Written and orally presented Senior Project report for CS490 – Senior Project I and CS491 – Senior Project II.	5.C. Students will receive a grade of C or better on the written and orally presented project report.	5.C. All students have received a grade of C or better on the written and orally presented project report. The rubric for determining the grade on student presentations was improved.	5. C. Continue to monitor the quality of the rubric.
6. The student will function as ethically and socially responsible computer professionals, including membership in professional organizations	6. A. Student participation in introductory discussions regarding ethics in CS110 – Computer Science I and CS120 – Computer Science II.	6. A. 90% of students will have participated in the ethics discussions in CS110 and CS120.	6. A. A majority of students participated in the ethics discussions in CS110 and CS120.	6. A. A more formal and organized approach to these discussions needs to be addressed.
	6. B. Student participation in discussions regarding restrictions in the use and acknowledgement of copyrighted and proprietary code in CS330 – Operating Systems.	6. B. 90% of students will have participated in the discussions regarding restrictions in the use and acknowledgement of copyrighted and proprietary code in CS330 – Operating Systems.	6. B. Students have been exposed to discussions regarding restrictions in the use and acknowledgement of copyrighted and proprietary code. Participation in these discussions have been limited.	6. B. Continued emphasis on these important topics. We will attempt to develop more objective measures and rubrics for these important topics.
	6. C. Participation in the student chapter of the Association of Computing Machinery.	6. C. At least 50% of junior and senior Computer Science majors are active members in the student chapter of the ACM.	6. C. There are 15 to 20 student members in the ACM.	6. C. We will continue to strive to increase membership.

IV Overview of changes implemented in your program this past year based on results and planned action specified in last year's report.

Forty-five Dell Optiplex 780 systems were ordered and installed in the Gullickson Hall labs in rooms 206A and GH211 during the summer of 2010. These systems included CUDA-compliant nVidia graphics cards, twenty-two inch widescreen monitors, and 4GB of main memory.

Three special topics course offerings were given in 2010: Parallel Computing in the Spring and XML Technologies in the Fall.

The Cyber Security course CS 340 was revamped to provide students with a higher degree of hands on exercises and assignments that reflects the dynamic and constant change in the field of Cyber Security. These changes were well received by the students.

Beginning in the fall of 2012, CS305 and CS310 will be consolidated into a single CS305 offering and the remaining topics were distributed across CS110 – Computer Science I, CS120 – Computer Science II, and CS210 – Algorithm Analysis and Design. Affected students were made aware of this change.

A required course, CS215 - Advanced Algorithm Analysis and Design is now being offered.

Grading rubrics for oral presentations and written reports were distributed to the students and used for grading in CS330 - Operating Systems.

Senior Projects were revamped so they include specific target dates and objectives along with the assignment of an individual faculty as a project advisor to supervise and monitor progress. Senior projects are also geared towards undergraduate research and scholarly projects.

V. Specify any changes/modifications made to your program based specifically on data obtained during Assessment Day Activities.

There was no data obtained during 2010 Assessment Day Activities. The specific changes made based on this non-data was to insert the following into the CS340 - CyberSecurity and CS491 - Senior Project II Syllabi:

Assessment Day Exam

You will be required to take the Major Field Achievement Test (MFAT) on Assessment Day, 04-Apr-12. The time of the exam will be announced.

VI. Assistance Needed with Assessment

None.