

Columbus State University
TSYS Department of Computer Science
Bachelor of Science in Computer Science
Comprehensive Program Review
Detailed Self-Study
November 2005

I. Brief Program Overview

The program prepares students for entry into the computing profession in various capacities or for further study at the graduate level. The program has two tracks.

The Systems Track provides the student with skills required to compete in today's computing environment and to be able to adapt to tomorrow. Much effort is expended ensuring that the program is viable and current, focusing on the newer technologies and emphasizing applications of current methods for the design and engineering of software systems.

The Applied Track gives the student a rigorous education in computer science with particular attention and practice given to mainframe business applications and web development. This program was initiated by a joint study agreement with the IBM Corporation, and was expanded by funding from the Intellectual Capital Partnership Program (ICAPP). It is particularly geared to the large system computing needs of the companies that dominate the local economy.

In conjunction with the Mission Statement of Columbus State University, the Department of Computer Science serves the educational needs of students of the university in the area of computing and the specific educational needs of the businesses and industries in our community. Computing continues to play a larger part in the educational experience of each student at Columbus State University. The Department of Computer Science is committed to playing a leadership role in this process.

II. Summary Findings of the Program's Overall Quality

The TSYS Department of Computer Science provides a high quality program to its students. The quality of teaching, quality of the curriculum, quality of faculty, quality of facilities, quality of research and scholarship, and quality of service are all above average. Efforts need to be made to improve the quality of students through recruitment and scholarship opportunities for exceptional students. The faculty need to continue to enhance the quality of instruction. Changes scheduled for Fall 2006 are expected to significantly improve the quality of the B.S. program.

II A. The Quality of Teaching Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.

Above Average

- *Explain how good teaching is assessed and rewarded.*

Each faculty member is required to submit a teaching portfolio (see http://csc.colstate.edu/policy/FacultyPerformanceEvaluationFinal_050830.doc). Teaching is the major criterion in annual faculty evaluations.

- *Explain how good advising is assessed and rewarded*

Each faculty member is required to be available in their office for a minimum of five hours per week with the hours distributed over at least three days of the week. Advising is an important consideration in annual faculty evaluations.

- *Describe opportunities for interaction that occur between faculty and students outside the classroom*

The Computer Science Department encourages interaction between faculty and students outside the classroom. With the faculty offices across the hall from the classrooms, there are plenty of opportunities for this interaction.

- Students are required to consult with their advisors prior to registration.
- Students are encouraged to consult with faculty members for help with assignments and to monitor their progress in courses.
- The student chapter of the Association of Computing Machinery holds regular meetings with faculty sponsors present.
- Colloquium events are held periodically and students are encouraged to present and/or attend.
- Student presentations are an integral part of open house events.
- Students prepare for programming competition under the supervision of faculty and then travel to compete in programming contests accompanied by faculty members.
- Students work on research projects under the supervision of faculty members.
- Students serve as tutors under faculty supervision.
- Students assist faculty members in developing and maintaining the departmental Web site.
- Students work closely with faculty members in completing independent studies courses.

- *Indicate the availability of tutoring*

A tutoring lab is available 48 hours per week staffed by tutors from a pool of 6 undergraduate and graduate students in CCT450.

- *Describe opportunities for internships, service-learning, practica, study abroad, and career planning and placement*

Internship and co-op opportunities are coordinated by a department faculty member in conjunction with the Career Center. At the time of this writing there are two students participating in internships and five additional department-related internships available.

A group of students traveled to India in March 2005 as part of a service-learning project and cultural exchange. A similar trip is planned for May 2006.

The department maintains active communication with area employers to find students and graduates to meet the employers' staffing needs. Career planning is discussed with students as part of advising. Students are encouraged to visit the Career Center for assistance in planning their careers.

Many faculty provide opportunities for the Career Center, International Student Center, and local business professionals to visit classes and speak to the students.

- *Describe methods to be pursued for program improvement.*

The department plans to increase the number of faculty members. It also plans to hire a computer specialist which will allow the faculty to focus more on instruction and less on computer systems management.

II B. The Quality of the Curriculum Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Describe the relationship between the program's curriculum and its outcomes*

The following expected outcomes are supported by the listed courses. In addition, students are required to take four additional upper-division courses in Computer Science that extend their knowledge in the different areas.

Graduates in the Bachelor of Science in Computer Science Systems Track will:

- be able to use an integrated development environment to code and implement an executable program (courses: CPSC 1301 - Computer Science 1, CPSC1302 - Computer Science 2, CPSC 2108 - Data Structures)
- have a basic understanding of theoretical aspects of computer science (courses: CPSC 2125 - Introduction to Operating Systems, CPSC 5115 - Algorithm Analysis and Design, MATH 2125 - Discrete Mathematics, CPSC 5129 - Programming Languages)
- be able to produce a software solution using an object-oriented programming architecture (courses: CPSC 1301 - Computer Science 1, CPSC 1302 - Computer Science 2, CPSC 2108 - Data Structures)
- be familiar with standard CPU architectures (courses: CPSC 2105 – Introduction to Computer Organization, CPSC 5155 – Introduction to Computer Architecture)
- understand the major differences among modern programming languages (course: CPSC 5129 - Programming Languages)

- be able to analyze, design and implement a solution to real-world scientific or engineering problems (courses: CPSC 4175 - Introduction to Software Engineering, CPSC 4176 - Senior Software Engineering Project)
- be familiar with methods used to design and access databases (courses: CPSC 3131 - Introduction to Database Systems 1)
- be able to demonstrate knowledge of social and ethical impact of computers (course: CPSC 3165 - Professionalism in Computing)

Graduates in the Bachelor of Science in Computer Science Applied Track will:

- be able to use an integrated development environment to code and implement an executable program (courses: CPSC 1301 - Computer Science 1, CPSC 1302 - Computer Science 2, CPSC 2108 - Data Structures, CPSC 2175 - Object-Oriented Design)
- be able to produce a web-based software solution using high-level development tools (courses: CPSC 4125 - Introduction to Server-side Web Development, CPSC 5165 - Web Development Projects)
- be familiar with standard CPU architectures (courses: CPSC 2105 - Intro to Computer Organization)
- understand the major differences among modern programming languages (course: CPSC 5129 - Programming Languages)
- be able to analyze, design and implement a solution to real-world information processing problems (courses: CPSC 3111 - Structured Programming with COBOL 1, CPSC 3156 - Introduction to Transaction Processing, CPSC 4125 - Introduction to Server-side Web Development, CPSC 5165 - Web Development Projects)
- be familiar with the theory and application of transaction processing (course: CPSC 3156 - Introduction to Transaction Processing)
- be familiar with methods used to design and access databases (courses: CPSC 3131 - Introduction to Database Systems 1)
- be able to demonstrate knowledge of the social and ethical impact of computers (course: CPSC 3165 - Professionalism in Computing)

- *Indicate how technological skills are incorporated into the program of study*

The program of study consists of subject matter primarily concerned with the acquisition and application of technological skills.

- *Indicate how the program is relevant to student needs*

The Bachelor of Science in Computer Science Systems Track program prepares students for graduate work by its emphasis on the mathematical and theoretical aspects of computer science. It also prepares students for positions in industry by providing them with skills in programming, databases, and software engineering.

The Bachelor of Science in Computer Science Applied Track program prepares students for direct entry into a career by focusing on skills relevant to the needs of the information industry. Students are prepared to follow two focused career paths –

mainframe computing and web development, as well as more traditional careers in computer related occupations. It also prepares students for graduate work by incorporating adequate coverage of the requisite theoretical foundation.

- *Describe how students are challenged to think across disciplines*

The program requires 42 hours of core classes representing various disciplines. Computers are used in many disciplines including business, engineering, science, and education. Many of the assignments given to students involve developing solutions to problems based in these areas.

- *Explain how diversity, multiculturalism, and international perspectives are included in the program*

Students are taught to isolate culture-specific features in software to facilitate adapting programs to diverse markets. For example, in Introduction to Internet Programming and Web Development Projects, students learn how to take into account the international audience when creating Web pages as well as how to implement localization.

- *Describe methods to be pursued for program improvement.*

The department has made several significant improvements in the last three years. Most importantly is an emphasis on hands-on activities in the classes, especially in the area of computer programming. Assessment of student programming is now emphasized in the introductory sequence. The adding of the Computer Science 1 Lab course in fall 2006 will strengthen the hands-on component of the introductory computer science course. The replacement of the Visual Basic Programming course with a Graphical User Interface course will expose students to a broader spectrum of languages and techniques with which to develop software applications. A number of the department's faculty now include significant individual and team programming projects as part of the course requirements.

As a result of student feedback, the Computer Organization and Computer Architecture courses now include a number of hands-on activities to reinforce the abstract concepts.

With the addition of the two course sequence in Software Engineering for the Systems Track and the three course sequence in Web Development for the Applied Track, students are now required to have a capstone experience that includes a significant programming project. Student comments and faculty observation seem to indicate that smaller but significant projects need to be incorporated in additional courses.

II C. Selectivity, Academic Achievement, and Satisfaction of Students in the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Satisfactory

Describe the characteristics of students in the program (i.e., test scores, overall GPA, retention rates)

BS Computer Science	2001/2002	2002/2003	2003/2004	2004/2005
Average SAT Verbal Score	508, n=211	502, n=214	509, n=197	513, n=161
Average SAT Math Score	512, n=211	515, n=214	516, n=197	527, n=161
Average Undergraduate GPA	2.73, n=300	2.60, n=299	2.68, n=282	2.71, n=236

**TSYS Department of Computer Science Retention Rates
for Undergraduate Programs**

Fall Semester Full-Time Entering Freshmen (*)

* The cohorts below are first-time full-time undergraduate students enrolled fall semester that entered CSU in the fall or the preceding summer term. Students in Certificate Programs are not included in Freshmen Cohort.

Fall 2002 Freshmen Cohort						
Number in Fall 2002 Cohort	Fall 2002 Cohort Returning Fall 2003		Fall 2002 Cohort Returning Fall 2004		Fall 2002 Cohort Returning Fall 2005	
	Number	Rate	Number	Rate	Number	Rate
46	27	58.70%	23	50.00%	17	36.96%

Fall 2003 Freshmen Cohort				
Number in Fall 2003 Cohort	Fall 2003 Cohort Returning Fall 2004		Fall 2003 Cohort Returning Fall 2005	
	Number	Rate	Number	Rate
39	27	69.23%	19	48.72%

Fall 2004 Freshmen Cohort		
Number in Fall 2003 Cohort	Fall 2003 Cohort Returning Fall 2004	
	Number	Rate
28	14	50.00%

- Describe student learning, satisfaction and evidence of success in meeting student needs and learning outcomes as reflected by major field assessment

In the student surveys (<http://csc.colstate.edu/cpr/>), students express satisfaction with their learning. The department continues to evaluate student satisfaction and continues to improve the program so that student needs are better met.

The scores from the ETS Major Field Test are below national average but improved between 2003 and 2004.

	2003	2004/5	Nat'l Avg
Total Raw Score out of 200	130.4	139.2	148.8
Programming Fundamentals	32.4%	45.3%	51.2%
Organization & Architecture/Operating Systems	20.8%	26.7%	32.3%
Algorithms / Theory & Computational Math	20.8%	24.4%	43.2%

- *Describe methods to be pursued for program improvement.*

The department is developing a student recruitment plan to increase the quality of students majoring in Computer Science programs which should improve retention rates and performance on standardized tests.

A department initiative is in place to improve student performance on standardized tests. The initial goal is for student performance to reach within one standard deviation of the national average. The department is inspecting the courses reflected on the exam and exploring ways to improve students' understanding. More hands-on work is required in most courses.

The department also plans to increase student involvement in research projects.

II D. The Quality of Faculty Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.

Above Average

- *Describe the adequacy of faculty and staff to support the program (locations of graduate training, post-graduate training, specializations, secondary fields)*

	2001/2002	2002/2003	2003/2004	2004/2005
Full-Time Faculty	11	11	12	11
Part-Time Faculty	1	4	5	5

The department currently has 12 full-time faculty members. This number is inadequate to effectively support the department's programs.

- *Describe the support provided for faculty development*

Over the last three years, the faculty has received nearly \$90,000 in support for faculty development. \$20,000 of this support was received from the College of Science and over \$13,000 from the University budget for Faculty Development. The balance was support from funds within the department. Over \$22,000 were stipends to faculty to prepare online courses. As a result of these funds,

- the faculty generated over one hundred publications,

- the faculty presented nearly forty invited talks around the world,
 - one faculty member has been conducting NSF Chautauqua workshops for the past ten years,
 - faculty members were reviewers for over thirty journals,
 - faculty members were conference organizers at more than thirty different computer professional conferences,
 - several faculty members were officers in professional organizations.
- *Show faculty diversity and credentials*

Faculty Diversity

	Fulltime Faculty				
	2001	2002	2003	2004	2005
Male (% male)	8(80%)	9(82%)	9(75%)	9(82%)	9(75%)
Female(% female)	2(20%)	2(18%)	3(25%)	2(18%)	3(25%)
Asian(% Asian)	1(10%)	1(9%)	2(17%)	1(9%)	3(17%)
Black(% Black)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
Hispanic(% Hispanic)	0(0%)	0(0%)	0(0%)	0(0%)	1(8%)
American Indian(% American Indian)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
Multi-Racial(% Multi-Racial)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
White()	9(90%)	10(91%)	10(83%)	10(91%)	9(75%)

Faculty Credentials

Dr. Wayne Summers

Professor and Distinguished Chairperson

Ph.D. in Mathematical Sciences; St. Louis University

Dissertation in Computer Science

Dr. Bhagyavati

Assistant Professor

Ph.D. Computer Science; University of Louisiana at Lafayette

Dr. Edward Bosworth

Assistant Professor

M.A., Ph.D. Physics; Vanderbilt University, Nashville, TN

M.S., Ph.D. Computer Science; University of Alabama in Huntsville,

Huntsville, AL

Rodney Clark

Part-time Faculty

MS Applied Computer Science; Columbus State University, Columbus,

GA

Johnnie Mae Conaway

Part-Time Faculty

BS Computer Science; Troy State University, Fort Benning, GA

MS Management; Troy State University, Fort Benning, GA

Ms. YongMi Kim

Assistant Professor

MS Applied Computer Science; Columbus State University, Columbus,
GA

Ph.D, Computer Science and Software Engineering; Auburn University-In
progress

Dr. Angkul Kongmunvattana

Associate Professor

Ph.D., Computer Science, University of Louisiana at Lafayette

Ms. Tena McQueen

Associate Professor in Science

M.Ed.; Auburn University

MS Applied Computer Science; Columbus State University, Columbus,
GA

Dr. Rodrigo Obando

Assistant Professor

Ph.D. in Electrical Engineering, Old Dominion University, Norfolk, VA.

Mr. Clyde Roberts

Part-Time Faculty

BS, Mech. Eng; Mississippi State University

MBA; Delta State University

Mr. Neal Rogers

Educational Specialist

MS Applied Computer Science; Columbus State University, Columbus,
GA

Ph.D, Computer Science and Software Engineering; Auburn University-In
progress

Ms. Aurelia Smith

Part-Time Faculty

MS Applied Computer Science; Columbus State University, Columbus,
GA

Dr. Cheryl Swanier

Part-Time Faculty

Ed.D. Auburn University

M.S. Computer Science, State University of New York
Ph.D, Computer Science and Software Engineering; Auburn University-In
progress

Prof. Chris Whitehead
Assistant Professor
Doctoral Student, Capella University (expected completion 9/05)

Dr. David Woolbright
Professor
Ph.D. in Mathematics; Auburn University

Mr. Burley Wright
Assistant Professor
M.B.A.; Columbus State University

Dr. Vladimir Zanev
Professor
Ph.D. in Computer Science; Sofia University, Bulgaria

- *Describe how part-time faculty are integrated into the program*
Part-time faculty members work closely with full-time faculty members to ensure that course outcomes are being realized. Part-time faculty members are provided office space with a telephone and computer resources. They are listed on the department web site and have their own web pages. They are invited to department meetings.
- *Describe methods to be pursued for program improvement.*
The department plans to increase the number of faculty members targeting candidates with expertise in areas that need stronger support. The department also plans to seek additional institutional support for instruction and research.

II E. The Quality of Facilities and Equipment Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Describe the condition and adequacy of available space*
Since summer 2003 the department has been housed in the new Center for Commerce and Technology on the fourth floor. All the space on the fourth floor except for one classroom is used by the department as well as a large lecture hall on the second floor. The space comprises three 30-seat classrooms, two 30-seat classrooms and one lecture hall with computers, a conference room, 21 offices, 2 rooms housing special-purpose laboratories, a library, a faculty workroom, department office, and storage areas. Classrooms are equipped with multimedia equipment including data projectors, computers, and playback equipment for video presentations. Offices are furnished

with modular desks, bookcases, and computers. The lobby areas are furnished with chairs and tables containing power receptacles and network connections. A wireless network is deployed and can be accessed within the building.

The condition of the department's space is very good. The space is fully utilized by the department.

- *Describe the condition and adequacy of technology labs, equipment, and library resources*

The computers in the labs are in good condition and adequate for current needs. The department maintains a library of computer related books and publications made up primarily of donations from faculty members.

- *Provide other indicators of adequacy of campus infrastructure to support the program*

The Computer and Information Networking Services department provides support to the department by maintaining and upgrading hardware and software as needed. The Simon Schwob Memorial Library supports the department by setting up facilities for online courses and maintaining the underlying software. The Library also maintains subscriptions to IEEE/ACM digital libraries and the Safari electronic reference library for the department and institution.

- *Describe methods to be pursued for program improvement.*

The department plans to hire a computer specialist to augment the support provided by the Computer and Information Networking Services department. Having this support within the department will allow faculty members to focus more on instruction and less on computer systems management.

The department will continue to upgrade its labs, hardware, and software.

II F. The Quality of Research and Scholarship Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Explain how faculty involve students in research*

Over the last three years faculty members and students have co-authored more than twenty publications and presentations. Faculty members actively encourage student involvement in research as well as attendance and participation at conferences, workshops, and forums.

- For the past two summers, eight students each year were funded through a NSF Research for Emerging Undergraduates to do research with a CSU faculty mentor. Three CSU undergraduates were selected each year.
- Two graduate and four undergraduate students are funded through a grant from the Georgia Courts to evaluate software for the Traffic Courts.

- Two CSU undergraduate were funded through a CREU grant to conduct research.
 - One graduate student funded through a OneGeorgia grant has conducted applied research in collaboration with Georgia Tech faculty and graduate students.
 - In the past three years, five graduate students have completed theses.
 - Two students, one graduate and one undergraduate were awarded the top prizes for their presentations at the ACM-Midsoutheast Conference.
- *Describe how faculty research relates to the program mission*
Faculty research often directly involves students and thereby enriches the learning experience. Research enhances the ability of faculty members to expose students to current relevant activities in the discipline.
 - *Describe mentoring and professional development opportunities for faculty*
Over the last 3 years faculty members have mentored and/or supervised research for over 25 undergraduate students and more than 10 graduate students. Graduate assistants are supervised by faculty members. Internship and cooperative learning positions are overseen by faculty members.
 - *List faculty publications, papers given, and public lectures*
A summary of relevant activity can be found in <http://csc.colstate.edu/CPR/faculty-productivity.xls> and detailed lists can be found in <http://csc.colstate.edu/CPR/Annual-Review-2002-3.doc> and <http://csc.colstate.edu/CPR/Annual-Review-2004-5.doc>.
 - *Describe methods to be pursued for program improvement.*
Faculty who receive faculty development funding are expected to present their results. Graduate assistants are required to attend while other undergraduate and graduate students are encouraged to attend these presentations. Students are encouraged to participate in independent research and supported in presenting their results at conferences. The department plans to increase internship opportunities for students and faculty as well as increase the department level of grant and external funding to expand research opportunities for undergraduate and graduate students.

II G. The Quality of Service Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Describe projects completed and outcomes which contribute to the program, department, college, institution, community, and/or the region*
The Computer Science faculty members are often called upon by university faculty and staff as well as others in the community to help with computer related problems. The faculty members are active on campus and in the community and region. Faculty

members serve on a large number of department, college, university and community level committees.

In 2002, several faculty created a Center for Academic Excellence in Information Assurance Education, wrote a proposal to NSA to have the curriculum recognized as meeting the National Security Agency (NSA) federal guidelines for information assurance. The Center has received recognition by the NSA for its mapping of the curriculum to NSTISSI-4011 and NSTISSI-4014 standards for training Information Systems Security Professionals and Information Systems Security Officers. In 2003, the department's Center for Information Assurance Education hosted a 4-day CISCO workshop on network security for faculty from CSU and five regional two-year and four-year schools. In 2004, the department hosted the first CSU Computer Security Awareness Day. This has been expanded this year to a Security Awareness Week and involves departments across the campus.

A number of faculty members are actively involved with the regional public schools, including serving as chief scorer for the Muscogee School Academic Decathlon and judge for the Muscogee School Page One competition. Several faculty members have served as mentors to local high school students in completing senior projects. Faculty members have visited the local high schools and talked about computer science and presented awards to the students.

A number of faculty members are actively involved in other community activities including organizing and serving as officers of the Columbus Regional Technology Association, serving as a member of the Phenix City-Columbus Business Division Advisory Council, serving as a member of the Southwest Georgia Technology Council, and serving as a member of TechPrep Program.

Several faculty are active in professional organizations including secretary to ACM Mid-Southeast Chapter and former Vice-President of the Chattahoochee Valley chapter of Infragard.

In 2004, the department hosted the first SIG-Ada Seminar at CSU.

- *Describe methods to be pursued for program improvement.*
Continue to encourage faculty members to seize and create opportunities for campus and community involvement.

II H. Program Honors & Awards

- *Identify the formal honors, awards, high rankings, citations of excellence, accreditations, positive external reviews, etc. that this degree program has received over the last seven years.*

- ❖ In 1997, the Computer Science Department received the University System of Georgia Award for Collaborative Excellence and the Georgia Economic Development Authority TERRIFIC Award
- ❖ In 2002, the Computer Science Department received recognition from the Committee on National Security Systems and the National Security Agency (NSA) for mapping the curriculum to NSTISSI-4011 – Training for Information Systems Security Professionals.
- ❖ In 2003, the TSYS Department of Computer Science received a \$500,000 endowment from Synovus in recognition of the long-standing relationship between the department and TSYS.
- ❖ In 2005, the Computer Science Department received recognition from the Committee on National Security Systems and the National Security Agency (NSA) for mapping the curriculum to NSTISSI-4014e – Training for Information Systems Security Officers.

- *If program accreditation is available but has not been attained at CSU, explain why.*

The department was without a chairperson for several years and there was insufficient interest in pursuing accreditation from faculty members to make success likely. The current chairperson is very interested in obtaining accreditation and is cultivating interest from faculty members making application likely in the near term.

II I. Exceptional Achievements & Honors of the Program's Students, Graduates, & Faculty

- *Identify the exceptional achievements and honors received by the program's students, graduates, and faculty over the past five years which reflect on the quality of the program.*

2002-2003

- Dr. Bhagyavati was College of Science nominee for the CSU Faculty Research and Scholarship Award, Spring 2003.
- Prof. McQueen was College of Science nominee for the CSU Faculty Service Award, Spring 2003.
- Dr. Linton was promoted to Full Professor.
- Dr. Zanev was promoted to Full Professor.
- Dr. Woolbright was a Spencer Scholar at Oxford.

2003-2004

- Dr. Kurkovsky was College of Science nominee for the CSU Faculty Research and Scholarship Award, Spring 2004.
- Dr. Kurkovsky was promoted to Associate Professor and received tenure.
- Dr. Woolbright and Prof. McQueen were Spencer Scholars at Oxford.
- Several faculty members served as officers in computer professional organizations.

2004-2005

- Karthik Harihar won first place for the graduate paper presentations at the ACM-Midsoutheast Conference.
- Fred Johnson won first place for the undergraduate graduate paper presentations at the ACM-Midsoutheast Conference.
- Dr. Bhagyavati and Dr. Kurkovsky were the College of Science nominee for the CSU Faculty Research and Scholarship Award, Spring 2005.
- Dr. Bhagyavati was selected as recipient of the CSU Faculty Research and Scholarship Award.
- Drs. Zanev, Kurkovsky, and Summers were Spencer Scholars at Oxford.

II J. General Success of the Program's Graduates

- *Report the results of the department's assessments of the general success of the program's graduates such as licensure or certification rates, job offers, job placement statistics, average salaries, subsequent career advancement, test scores, admissions to post-baccalaureate programs, etc.*

Between 2002 and 2005 there were 136 graduates of the program. 29 are believed to be employed by TSYS, 12 by other employers in Columbus, 10 by other employers outside Columbus, 87 are in graduate study, and the employment status of the remainder isn't known.

Area employers, most notably TSYS, frequently approach the department about providing employee training. Earning a degree from CSU or elsewhere is sometimes the basis for accelerated promotion.

II K. Stakeholder Satisfaction with the Program

- *Report the results of surveys of students, alumni, employers, community partners, etc. concerning their satisfaction with the quality of the program and its learning experiences and any program improvements initiated as a function of such feedback over time.*

See the document "COMPUTER SCIENCE UNDERGRADUATE EXIT SURVEY 2003-2004" at <http://csc.colstate.edu/wright/CPR/surveys-2003-2004 - UG reduced.doc>

Improvements initiated as a result of these findings include the addition of a separate lab course in Computer Science 1, having introductory courses increasingly taught and coordinated by full-time faculty, and the acquisition of Silicon Graphics and Apple workstations to expose students to alternative computing platforms.

- *Also comment on the effectiveness of the program's use of a community advisory board.*

The department's Industry Advisory Board includes representatives from Microsoft, Wellpoint, Columbus Regional Healthcare Systems, AFLAC, and TSYS.

The Board has made numerous suggestions regarding the department's programs and many of those suggestions have resulted in modifications to the curricula. The advisory board needs to be used more effectively.

II L. Program's Responsiveness to Change & Improvement

- *Cite the most significant examples of improvements made in the program over the last seven years in response to changing conditions, new external requirements, and/or departmental assessment initiatives.*

In 2003, the department relocated to the new Center for Commerce and Technology. This has increased the interaction between students and faculty and within the students. Accompanying this move was the acquisition of new equipment which has enhanced the program.

A significant upgrade of the curriculum was implemented in 2003 reflecting recent developments in computer science and incorporating ACM guidelines. Beginning in fall 2003, a minimum grade of C is required for all computer science courses applied to degree requirements in the major areas.

In an attempt to improve the retention of students in the introductory courses, Java replaced C++ as the language used in the introductory courses in 2004. This was done after receiving recommendations from the advisory board and comparing our program with other universities.

Beginning in fall 2006 a minimum grade of C will be required for all computer science prerequisites. This is intended to increase the quality of students in the program. Based on feedback from students and faculty, CPSC 1301 will now include a three hour (one-credit) lab. This is expected to improve the students programming skills and performance in subsequent classes.

- *Comment on how frequently the program's faculty is engaged in program assessment activities, comprehensive program evaluations, and fine tuning of the program and its requirements.*

Assessment is an ongoing process with particular emphasis on obtaining feedback from students as they graduate. Each year, the department completes a program assessment consisting of student evaluations, major field tests, along with other measures including alumni and employer evaluations. The results of this assessment are discussed at the department's first meeting of the academic year and concerns and recommendations are incorporated into the charges to the different department committees. Recently efforts to track alumni have been strengthened and will become a regular part of the overall assessment process. A comprehensive program review is completed every seven years.

III. Summary Findings of the Program's Overall Productivity

Productivity in the Bachelor Science in Computer Science is strong but can be improved. The productivity indicators enrollment of students in the program, annual degree production, efficiency & clarity of the program's course requirements, position of program's annual degree productivity among comparable USG Programs, program's

responsiveness to state needs and employer demand for program graduates, and program's contribution to achieving CSU's Mission are all above average.

The department needs to work on program completion efficiency and graduation rate, frequency and sequencing of course offerings required for program completion, enrollment in the program's required courses, diversity of program's majors and graduates, and cost effectiveness of instructional delivery in the program's department. This can be facilitated by hiring an additional faculty member to improve the course offerings, and by implementing several curriculum changes scheduled for Fall 2006 to improve retention. Recruitment of students from underrepresented groups needs to be increased.

III A. Enrollment of Students in the Program

State your assessment of the strength of the evidence of program productivity on this indicator.

Above Average

- *Analyze and interpret the numbers of enrolled upper division majors in the program and the enrollment trends of these majors for the past five years.*

BS Computer Science				
Number of Declared Majors - Fall Semester	2001/2002	2002/2003	2003/2004	2004/2005
Full-Time	168	178	168	141
Part-Time	134	121	116	96
<i>Total</i>	<i>302</i>	<i>299</i>	<i>284</i>	<i>237</i>

Enrollment is declining but the trend is similar for computer science programs nationwide.

- *Compare the strength of the numbers of the upper division majors and enrollment trends for this program with the enrollments and trends of upper division declared majors in other undergraduate programs at CSU.*

The number of upper division majors and enrollment in the B.S. Computer Science programs has dropped significantly this past year in contrast to most majors on campus. This is consistent with what is happening at most universities across the U.S. The actual numbers are still large compared to most programs at CSU.

- *Describe methods to be pursued for program improvement.*

The department has increased its efforts to make potential students more aware of our programs by having department members visit area high schools and sponsoring events such as open houses and meetings of TechExplorers (an organization of student computing enthusiasts). There are currently plans to start a computer programming / web design competition for high school students in Spring 2006.

III B. Annual Degree Productivity of the Program

State your assessment of the strength of the evidence of program productivity on this indicator.

Above Average

- *Analyze and interpret the numbers of degrees granted annually (fiscal year) by this program and the trends of the program's degree productivity over the past five years.*

Number of Degrees Conferred - Fiscal Year	2001/2002	2002/2003	2003/2004	2004/2005
BS Computer Science	45	53	39	44

The number of degrees conferred has been relatively stable over the last four years.

- *Compare the strength of the degree productivity of this program with the productivity of other undergraduate programs at CSU.*

Even with the drop in graduation, the number of students receiving a B.S. in Computer Science is among the top four undergraduate programs on campus.

- *Describe methods to be pursued for program improvement.*

The department has increased the standards for prerequisites which is anticipated to improve the quality of students as they advance through the program. The addition of a three-hour lab for Computer Science 1 is expected to also improve the quality of student performance in subsequent classes.

The department is developing a student recruitment plan to increase the quality of students majoring in Computer Science programs which should improve retention rates and degree productivity.

III C. Program Completion Efficiency & Graduation Rate

State your assessment of the strength of the evidence of program productivity on this indicator.

Satisfactory

- *Analyze and interpret the program's graduation rate.*

Graduation Rate* - Fiscal Year	2001/2002	2002/2003	2003/2004	2004/2005
BS Computer Science	15%	18%	14%	19%

**graduates divided by majors*

Rate is relatively stable over the last four years.

- *Compare the program's graduation rate with those of the other undergraduate programs at CSU and offer possible explanations for this program's unusually high or low graduation rate if applicable.*

Since a large percentage of students majoring in Computer Science are already employed and attending school part time, the graduation rate (six-year) is typically lower. The overall number of graduates with a B.S. in Computer Science is one of the largest on campus.

- *Describe methods to be pursued for program improvement.*

The department is developing a student recruitment plan to increase the quality and quantity of students majoring in Computer Science programs which should improve the graduation rate.

III D. Efficiency & Clarity of the Program's Course Requirements

State your assessment of the strength of the evidence of program productivity on this indicator.

Above Average

- *Analyze the published course requirements for program completion in terms of the simplicity and efficiency of the program's curricular design and the degree to which program requirements are communicated clearly and effectively.*

Course requirements and prerequisites allow for completion of program requirements to be accomplished in a minimum of six terms assuming courses are scheduled when needed. See the diagram of course prerequisites at

http://cs.colstate.edu/html_hi/programs/ug_prereqs.aspx

and the programs of study at

http://cs.colstate.edu/html_hi/programs/ug_programs_of_study.aspx

- *Comment on the ease with which majors understand and successfully navigate through the required curriculum for program completion.*

Course requirements and prerequisites are available in the printed CSU catalog, the multimedia CSU catalog on CD-ROM, the CSU web site, and the department's web site. The department's web site also contains prerequisite diagrams for undergraduate and graduate programs as well as projected schedules and programs of study for the BS degree program. Students can also seek advice from faculty as needed.

- *Describe methods to be pursued for program improvement.*

The department plans to increase the number of faculty members. The department continually strives to improve student advisement and registration procedures.

III E. Frequency and Sequencing of Course Offerings Required for Program Completion

State your assessment of the strength of the evidence of program productivity on this indicator.

Satisfactory

- *Analyze and interpret the scheduling and enrollment history of courses required for program completion, giving particular focus to the regularity, frequency, and sequencing of course offerings required for program completion.*

Introductory courses are offered every semester during daytime and evening hours except for evening only during summer semester. Required courses are offered regularly and typically alternate between daytime and evening hours to accommodate students' schedules. See the department's projected schedule at http://cs.colstate.edu/html_hi/academics/projected_schedule.aspx

Students are encouraged to provide feedback online at http://cs.colstate.edu/html_hi/academics/course_requests.aspx

- *Describe methods to be pursued for program improvement.*

The Department continues to monitor enrollment patterns to refine scheduling of courses as well as immediate requests from students. There are plans to hire an additional faculty member to allow more courses to be offered during the fall and spring semesters and to minimize the number of required course that must be offered in the summer semester.

III F. Enrollment in the Program's Required Courses

State your assessment of the strength of the evidence of program productivity on this indicator.

Satisfactory

- *Analyze and interpret the strength of the enrollments in the courses required for program completion.*

Average Course Enrollment - Fall Semester	2001/2002	2002/2003	2003/2004	2004/2005
1000 Level Courses	28.7	27.4	26.8	29.0
2000 Level Courses	19.7	23.2	28.3	17.8
3000 Level Courses	20.5	21.4	22.9	16.1
4000 Level Courses	15.0	9.5	9.0	18.0
5000 Level Courses	11.8	8.6	12.9	9.4
Overall Average	18.6	17.1	18.6	16.3

The enrollment patterns of students in the program are fairly stable and predictable. There seems to be a decrease in enrollment in several levels this past year that needs to be monitored.

- *Comment on differences between core and elective course enrollments as well as differences among courses required for optional tracks or concentrations. Identify any required courses that are dropped from the schedule of classes frequently due to low enrollment and which majors must complete through approved substitutions or directed studies.*

The only courses cancelled due to low enrollment for fall and spring semesters have been electives, no core courses have been cancelled. Summer courses are required to generate sufficient enrollment to underwrite their delivery so occasionally core as well as elective courses have been cancelled.

- *Describe methods to be pursued for program improvement.*

The Department continues to monitor enrollment patterns to refine scheduling of courses as well as immediate requests from students.

III G. Diversity of the Program’s Majors and Graduates

State your assessment of the strength of the evidence of program productivity on this indicator.

Satisfactory

- *Analyze and interpret the gender, ethnicity, nationality, and age of the upper division majors and graduates in the program.*

BS Computer Science				
Gender	2001/2002	2002/2003	2003/2004	2004/2005
Female	93	76	70	47
Male	209	223	214	190
Total	302	299	284	237
Ethnic Origin	2001/2002	2002/2003	2003/2004	2004/2005
International Students	8	10	6	5
Asian	11	13	8	5
Black	87	97	78	59
Hispanic	5	3	10	9
American Indian	1	0	1	1
Multi-Racial	13	8	11	10
White	177	168	170	148
Total	302	299	284	237
Age	2001/2002	2002/2003	2003/2004	2004/2005
Under 21	111	108	88	68

21 - 25	91	91	94	78
26 - 30	42	45	54	45
31 - 40	45	43	35	37
41 - 50	12	9	12	8
51 - 60	1	2	1	1
Over 60	0	1	0	0
Total	302	299	284	237
Average	24.6	24.8	25.2	25.4

- *Comment on the program's success and distinctiveness in enrolling and graduating a diverse mix of students.*

Computer science has historically had low numbers of female majors and our situation is no exception. The number of female majors in Computer Science has dropped drastically the past year. This is consistent with national trends. With regard to other demographic criteria the program has been successful in attracting a diverse student population.

- *Describe methods to be pursued for program improvement.*

The department has as a strategic planning initiative to increase the diversity of students majoring in computer science as part of its recruitment strategy. Several faculty recently wrote a grant proposal to the National Science Foundation seeking funding to increase diversity in the program.

III H. Cost-Effectiveness of Instructional Delivery in the Program's Home Department

State your assessment of the strength of the evidence of program productivity on this indicator.

Satisfactory

- *Contrast the instructional cost-effectiveness of this program's home department with others at CSU.*

Cost per Credit Hour	2001/2002	2002/2003	2003/2004	2004/2005
TSYS Department of Computer Science (Credit Hours Taught Fall and Spring Semesters)	\$214	\$210	\$202	\$223
Columbus State University (Fiscal Year)	\$200	\$179	\$160	\$162

- *List the principal factors that cause this program's home department appear to be unusually cost-effective (i.e., have a low ratio of instructional expenses per*

weighted credit hour of instruction) or appear to be unusually costly (i.e., have a high cost per credit hour).

Salaries for department faculty members are higher on average than many departments at CSU, but are below salaries for computer science faculty at peer institutions. The department supports a graduate program which has higher cost expectations. Computer Science has a higher demand for equipment than most departments.

- *Comment on the degree to which this program contributes to or detracts from the cost-effectiveness of the department.*

The program contributes significantly to the department's cost-effectiveness.

- *Describe methods to be pursued for program improvement.*

The department is looking at moving the mainframe courses from the system at the University of Georgia to the one at Marist College which will eliminate an estimated \$20,000 in annual charges for mainframe resources.

III I. Program's Responsiveness to State Needs and Employer Demand for Program Graduates

State your assessment of the strength of the evidence of program productivity on this indicator.

Above Average

- *Comment on the demand for graduates of this program, followed by an assessment of the program's success in responding productively to such need and demand.*

Both anecdotal feedback and the results of formal surveys indicate that demand for graduates from the program is strong. Meetings this year with local companies confirm this demand. The program is attempting to respond to this demand.

- *List the factors that limit the program's ability to be more productive and responsive to these needs and demands.*

Factors include an insufficient number of full-time faculty members as well as a shortage of exceptionally talented students.

- *Describe methods to be pursued for program improvement.*

The department continually monitors employer demand through its own efforts as well as those of the University's Career Center with whom the department maintains a close relationship. The curriculum is frequently reevaluated to determine if adjustments are needed to respond to the needs of the employer community.

III J. Position of the Program's Annual Degree Productivity among Comparable USG Programs

State your assessment of the strength of the evidence of program productivity on this indicator.

Above Average

- *Identify the ranking of this program relative to comparable programs in the University System of Georgia (or region or nation) in terms of the number of degrees granted annually.*

Within the University System of Georgia for Fiscal Year 2004 including CIP Codes: 11.0101 Computer and Information Sciences, General; 11.0701 Computer Science; and 11.0202 Computer Programming, Specific Applications:

With 64 degrees awarded, Columbus State University ranked fifth out of 18 institutions that awarded bachelors degrees.

- *Describe methods to be pursued for program improvement.*

The Columbus area is expected to experience considerable population growth due to recently announced relocations of military personnel to Fort Benning. This should provide the department's and institution's programs with an expanded market for students. Many of the methods for program improvement cited for previous indicators will also play a role in improving the standing of the department's programs. Some of these include the plan to increase the number of faculty members, developing a student recruitment plan, increasing institutional support for instruction and research, and pursuit of accreditation for the department's programs.

III K. This Program's Contribution to Achieving CSU's Mission

State your assessment of the strength of the evidence of program productivity on this indicator.

Above Average

- *List the substantive contributions this program makes to the achievement of CSU's published statement of institutional mission.*

The program serves the educational, cultural, and economic needs of the region by producing graduates who are prepared to enter the computing profession in various capacities. The program serves transfer and transient students as well as those seeking certification and licensure. The program contributes to a strong core of general education as the foundation of the University's academic programs.

- *Describe methods to be pursued for program improvement.*

All the methods for program improvement cited for previous indicators will also enhance the program's contributions to the University's mission.

IV. Conclusion about the Program's Viability at CSU

The faculty of the TSYS Department of Computer Science has concluded that the Bachelor Science in Computer Science is viable. Support of the program should be increased to better serve the needs of the community.

V. Program Improvement Plan

Highlight the department's plans, priorities, and timetable for improving the program's quality and productivity if the program is judged to be viable.

The department has concluded that the program is viable. Plans for future improvements include:

- Increasing the number of faculty members. The first addition is planned for fall 2006.
- Hiring a computer specialist by spring 2006 to support faculty in their hands-on instruction.
- Require a C or better grade for all prerequisite courses. This will improve the quality of students.
- Adding the Computer Science 1 Lab course in fall 2006.
- Add an additional Discrete Math course to the Systems Track requirements to increase the students' knowledge of theoretical concepts in computer science.
- Replacing the Visual Basic Programming course with a Graphical User Interface course in fall 2006 to provide more options for the students.

The following improvements are currently underway:

- Developing a student recruitment plan.
- Improving student performance on standardized tests.
- Increasing student involvement in research projects.
- Seeking additional institutional support for instruction and research.
- Having faculty who receive faculty development funding present their results.
- Expanding internship opportunities for students and faculty.
- Increasing the department level of grant and external funding.
- Encouraging faculty members to seize and create opportunities for campus and community involvement.
- Increasing efforts to make potential students more aware of our programs.

VI. Summary Recommendation

Highlight the department's recommendations, rationale, plans, and timetable for expanding, maintaining, reducing, or consolidating/discontinuing the program.

The department recommends expanding the program due to its significant contribution to the institution's mission. There has been an increased awareness and emphasis on information technology and computing in the Columbus region. The TSYS Department of Computer Science is increasingly being expected to take a leadership role in these activities and provide expertise in these areas. The department should intensify its efforts to improve the program's faculty, curriculum, and students.