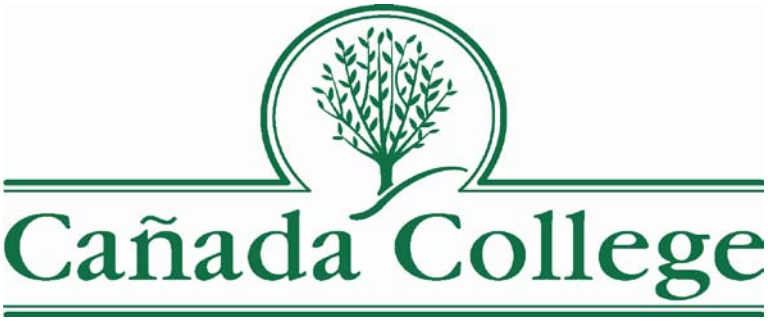

PROGRAM REVIEW

Computer Information Science

April 2009

Chuck Iverson, chair

COMPUTER INFORMATION SCIENCE

CAÑADA COLLEGE
COMPREHENSIVE PROGRAM REVIEW EXECUTIVE SUMMARY
(2 page maximum)

Short Summary of Findings

Type your summary here:

Computer information science is a small program with limited enrollment. However, the skills taught in these classes are important for computer-science, physics and engineering students and professionals seeking advancement in the workplace. Recently there has been increased interest in programming from the high schools and either recruiting in the high schools or offering programming classes in the high schools may be a way to increase interest in the sequence of programming classes. Offering short courses in current hot topics could spike interest and participation in our program. The program currently has up-to-date computers and software, but the computers will need to be updated in the future as technology advances.

Three Strengths of the Program

1. **Dedicated full-time faculty member with experience teaching programming**

2. **New computer lab**

Number of students?

3. **Our small number of transfer students in CIS have done well at 4-year schools (UC-Berkeley, UC-Santa Cruz)**

Three Suggestions for Improvement

1. **Increase recruitment efforts in order to increase enrollment.** By how?

2. **Offer classes in current hot topics (e.g., Ruby, Ruby on Rails, iPhone, Objective-C Programming) and offer evening and weekend short courses to appeal to professionals seeking to update their skills.**

3. **Update courses required to get CIS certificate.**

CAÑADA COLLEGE
COMPREHENSIVE PROGRAM REVIEW SELF-STUDY DOCUMENT

In preparing this Program Review, keep the college mission in mind as a reminder that Program Review is to ensure that all programs are aligned with the institutional mission.

Cañada College's Mission: It is the mission of Cañada College to ensure that students from diverse backgrounds achieve their educational goals by providing quality instruction in transfer and general education courses, professional/technical programs, basic skills and activities that foster students' personal development and academic success. Cañada College accepts responsibility for serving the community's diverse needs for lifelong enrichment and highly values close teacher to student teaching and learning relationships, support services and a co-curricular environment that contributes to personal growth and success for students.

PROGRAM NAME: Computer Information Science

PART A: Overview of Program

1. If the program has completed a previous self-study, evaluate the progress made toward previous goals.

Course offerings have not changed and enrollment has remained low since the last self- study. Now there is only one instructor in the program, rather than two, and he also teaches math and physics courses. This semester (spring 2009) there has been a noticeable and promising increase in enrollment in CIS courses, but it's too early to tell what that means long term.

2. State the goals and focus of this program and explain how the program contributes to the mission, comprehensive academic offerings, and priorities of the College and District.

This program offers computer-programming classes for a variety of students, a small but determined group of computer-science transfer students, a few business students and a relatively large group of science and engineering students. The classes also serve to enhance skills for persons in highly technical occupations within the workforce.

3. If the student population has changed, state how the program is addressing these changes. Document the demographic trends.

Student Ethnicity	**Fall 2004**	**Fall 2005**	**Fall 2006**	**Fall 2007**	**Fall 2008**
Unique Headcount	**18**	**29**	**16**	**21**	**16**
African-American	1		1		
Asian or Pacific Islander	2	5	4	3	2
Caucasian	6	11	2	6	6
Hispanic	9	8	6	6	4
Native-American					
Other Ethnicity		5	3	6	4

This program is quite small and the changes in numbers of students in the different ethnic groups is not significant.

4. If the program utilizes advisory boards and/or professional organizations, describe their roles.

This program does not utilize an advisory board.

PART B: Curriculum

1. Describe how the courses offered in the program meet the needs of the students and the relevant discipline(s). (This may be answered through narrative or quantitative evaluation).

The program currently offers five courses, each with an accompanying open (unsupervised) lab: CIS 118 (an introduction to programming and object-oriented programming in Java for students with no prior computer-programming experience). The remaining courses are offered in two tracks, one for C++ and one for Java: CIS 250 (C++) and CIS 284 (Java) (courses which extend the object-oriented concepts introduced in CIS 118 and make heavy use of algorithms and data structures in the standard libraries), and CIS 252 (C++) and CIS 286 (Java), which emphasize the concepts behind and give students extensive practice in developing their own algorithms and data structures.

All of these courses are essential for computer-science majors and many science and engineering majors. CIS 118 and either CIS 250 or CIS 284 provide a good skill set for business majors who may need to do financial analysis, and other engineering majors will have a solid foundation for writing their own analytical programs.

2. State how the program has remained current in the discipline(s).

C++ and Java remain very popular languages in the field, and our courses offer a solid foundation for further work in CIS at 4-year schools and industry.

3. All course outlines in this program should be reviewed and, if appropriate, revised every six years. If this has not occurred, please list the courses and present a plan for completing the process.

The following is a list of the currently active courses in this program. The course outlines have all been updated this spring (2009).

CIS 118	INTRODUCTION TO OBJECT-ORIENTED PROGRAM DESIGN
CIS 119	OPEN COMPUTER LAB I
CIS 250	PROGRAMMING METHODS I: C++
CIS 251	OPEN COMPUTER LAB I: C++
CIS 252	PROGRAMMING METHODS II: C++
CIS 253	OPEN COMPUTER LAB II: C++
CIS 284	PROGRAMMING METHODS I: JAVA
CIS 285	OPEN COMPUTER LAB I: JAVA
CIS 286	PROGRAMMING METHODS II: JAVA
CIS 287	OPEN COMPUTER LAB II: JAVA

4. If external accreditation or certification is required, please state the certifying agency and status of the program.

External accreditation or certification is not required.

5. Describe how your program is articulated with similar departments within SMCCD, the Sequoia High School District and/or other four year institutions. (Include articulation agreements, common course numbering etc.)

Cañada Course	CSM Course	UC-Berkeley Course	San Jose State Course
CIS 118	CIS 254		
CIS 250	CIS 278	CS61A	CS46A
CIS 284	CIS 255	CS61A	CS46A
CIS 252	CIS 279	CS61B	CS46B
CIS 286	CIS 256	CS61B	CS46B

6. Discuss plans for future curricular development and/or program modification.

It may be beneficial to offer short courses in current hot topics in CIS such as Ruby, Ruby on Rails, Python, Objective-C, iPhone Programming.

PART C: Student Outcomes

1. Please attach all Bi-Annual State of the Department reports from the past six years.

Metric	Fall 2004	Fall 2005	Fall 2006	Fall 2007	Fall 2008
WSCH	113	171	107	132	107
FTES	3.8	5.7	3.6	4.4	3.6
FTE	0.2	0.5	0.4	0.4	0.2
Load	567	317	298	331	535
Unique Headcount	**18**	**29**	**16**	**21**	**16**
Success Rate	53%	70%	59%	62%	44%
Retention Rate	67%	77%	69%	81%	22%

Why is success & retention so low?
2 in 5 pass
1 in 5 is retained

2004-08	2005-08	2006-08	2007-08
-5%	-37%	0%	-19%
-6%	-37%	0%	-19%
0%	-63%	-44%	-50%
-6%	69%	80%	62%

2. Update any analysis to include a summary of all years. Attach student learning outcomes here.

The large fluctuation in the numbers appears to be fairly random due to the small sample size.

CIS 118/119

By the end of this course, students will be able to

1. Correctly write, compile and execute a Java program to solve a simple problem with user input.
2. Correctly implement a class in Java and create a driver program to test the class.
3. Correctly use decision structures in a Java program to execute alternatives depending on user input.
4. Correctly use iteration in a Java program to solve a problem.
5. Correctly use an array to store data read from a file, process the data and write the results to a file.
6. Correctly implement a GUI interface for a Java application or applet.

CIS 250/251

By the end of this course, students will be able to

1. Write a well-structured object-oriented program including appropriate use of selection and looping control structures.
2. Create objects which implement a UML diagram.
3. Effectively use data structures from the Standard Template Library to solve a problem.
4. Select appropriate algorithms for solving particular problems.
5. Provide proper management of dynamic memory.
6. Perform necessary file operations for either text or binary files.

CIS 252/253

By the end of this course, students will be able to

1. Correctly use Big-O notation to describe how the runtime of an algorithm depends on size.
2. Correctly use a linked-list solve a problem.
3. Correctly implement an abstract data type (ADT) as a C++ class.
4. Correctly use recursion to solve a problem with trees.
5. Correctly use recursion to solve a problem with graphs.
6. Correctly determine the relative runtimes of different sort algorithms on arrays of different sizes.
7. Correctly solve a problem with binary search trees (BSTs).
8. Correctly solve a problem with red-black trees.

CIS 284/285

By the end of this course, students will be able to

1. Correctly use control structures in a program.
2. Correctly use an array to solve a problem.
3. Correctly use references, dynamic memory allocation and file operations to solve a problem.
4. Correctly use library classes and exceptions to handle errors in a program.
5. Correctly use inheritance to solve a problem.

CIS 286/287

By the end of this course, students will be able to

1. Correctly use Big-O notation to describe how the runtime of an algorithm depends on size.
2. Correctly use a linked-list solve a problem.
3. Correctly implement an abstract data type (ADT) as a Java class.
4. Correctly use recursion to solve a problem with trees.
5. Correctly use recursion to solve a problem with graphs.
6. Correctly determine the relative runtimes of different sort algorithms on arrays of different sizes.
7. Correctly solve a problem with binary search trees (BSTs).
8. Correctly solve a problem with red-black trees.

CIS 372/373 – No SLOs, course has never been taught.

PART D: Faculty and Staff

1. List current faculty and staff members in the program, areas of expertise, and how positions contribute to the program success.

Charles Iverson is the only faculty member in this discipline. He is a full-time faculty member with a background in computer programming, electrical and computer engineering and physics, who also teaches mathematics, physics and engineering.

2. List major professional development activities completed by faculty and staff in this program in the last six years and state what development is needed or proposed by faculty in this program.

Charles Iverson participated in a one-week workshop on teaching functional programming as an introduction to Java programming held summer 2008 at CalPoly State University in San Luis Obispo: Teach Scheme - Reach Java Workshop.

3. Describe the departmental orientation process for new full-time and adjunct faculty and staff (please include student workers such as tutors and aides).

The last full-time faculty member was hired in 1994. We haven't had an adjunct faculty member or staff in the last six years, at least. However, we have had students who have been successful in CIS courses act as tutors for current students.

PART E: Facilities, Equipment, Materials and Maintenance

1. Discuss the quality and accessibility of the facilities, equipment, equipment maintenance, and materials available to the program. List projected needs.

The program predominantly utilizes the computer labs in 22-118, the MESA Center, and 16-110 (which was recently renovated, including the installation of new computers). These computer facilities are perfectly adequate for our current needs, and will probably remain satisfactory until fall 2011. By that time, we'll probably need new hardware (25 machines for 22-118, 15 machines for the MESA Center and 25 machines for 16-110).

If we add courses on Objective-C or programming the iPhone/iPodTouch, we'll need access to a lab of Macintosh computers.

2. Describe the use and currency of technology. List projected needs.

As mentioned above, the program has access to a computer lab (shared with physics and engineering) that includes computers new as of Aug. 2008. Access to fast computers and the latest software is essential to the success of computer programming classes. Fortunately, the software we use is free, but it's important to have relatively new hardware. We're probably in good shape, hardware wise, until fall 2011. The cost of any upgrade at that time should be shared between the Engineering, Physics and Computer Science Departments.

If we add courses on Objective-C or programming the iPhone/iPodTouch, we'll need access to a lab of Macintosh computers.

3. If applicable, describe the support the program receives from industry. If the support is not adequate, what is necessary to improve that support?

The program receives no support from industry.

PART F: Budget Request

1. What faculty positions will be needed in the next six years in order to maintain or build the department?

Six years is a very long time in the computer industry. If there is a resurgence of employment opportunities for people in Silicon Valley, then our enrollments will increase and we'll need to hire new full-time and adjunct faculty, but that possibility is not clear at this time.

2. What staff positions will be needed in the next six years in order to maintain or build the department? (Staff, facilities, equipment and/or supplies) will be needed in the next six years?

No increase in staff is anticipated in the next 6 years.

3. What equipment will be needed in the next six years in order to maintain or build the department?

The computers and software will need to be updated in 2-3 years, depending on changes in technology and programming systems. We estimate that hardware upgrades (25 machines for 22-118, 15 machines for the MESA Center and 25 machines for 16-110) will run about $1000 each (new monitors should not be required) for a total of about $65,000.

4. What facilities will be needed in the next six years in order to maintain or build the department?

No additional facilities will be needed in the next 6 years.

PART G: Additional Information

1. Describe any other pertinent information about the program that these questions did not address?

Metric	Fall 2004	Fall 2005	Fall 2006	Fall 2007	Fall 2008
Unique Headcount	**18**	**29**	**16**	**21**	**16**
Female	4	6	1	1	3
Male	14	23	15	19	12
Gender NA				1	1
Less than 20 yrs old	3	7	4	6	6
Between 20 & 29 yrs old	14	17	9	13	6
Between 30 and 49 yrs old		5	2	1	4
50 Years old & older	1		1	1	
No High School Degree		2	2	2	1
Concurrent Enrollment					
High School Degree or Equiv	17	17	10	15	11
Foreign Secondary Degree		4	3	1	
Post Secondary Degree	1	5	1		2

Students in these classes are predominantly male, high school graduates between 20 and 29 years old. Although there are occasional changes in these numbers for one year, there has not been a significant trend towards or away from one group over the past 5 years.

See Jeannie Mecoreny on women in technology. Are you working on rewriting females for this program?

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EVALUATION OF THE
COMPREHENSIVE PROGRAM REVIEW PROCESS

To improve the Program Review process your help and suggestions are instrumental. We ask that all parties responsible for preparation of this review have input into the evaluation. After completion of the Program Review process, please take a few moments to complete and return this evaluation to the chair of the Curriculum Committee.

Program Name:

Estimate the total number of hours to complete your Program Review:

4

Was the time frame for completion of Program Review adequate? If not, explain.

yes

Was the instrument clear and understandable? Was it easy to use? If not, explain and offer suggestions for improvement.

yes

Were the questions relevant? If not, please explain and offer specific suggestions.

yes

Did you find the Program Review process to have value? If not, please explain and offer suggestions.

yes

Was the data you received from administration complete and presented in a clear format? Would you like additional data?

The data was clear and complete.

Please offer any comments that could improve and/or streamline Program Review!

CAÑADA COLLEGE
Comprehensive Program Review Checklist

X Comprehensive Program Review Self-Study Document

X All Bi-Annual State of the Department Documents since last Program Review

X Executive Summary

X Completed Evaluation of the Comprehensive Program Review Process Form

X Additional data as necessary

Date: April 3, 2009

Program Name: Computer Information Science

Review Committee Chair: Chuck Iverson

Review Committee Members:

CAÑADA COLLEGE
Comprehensive Program Review
Comments Sheet

Program Name: Computer Information Science

Page	Comment	Commentator
2	Number of students?	Linda Hayes
2	How can enrollment be increased?	Linda Hayes
5	Why is success & retention so low? 2 in 5 pass,1 in 5 is retained	Linda Hayes
8	See Jeannie Mecoreny on women in technology. Are you working on rewriting females for this program?	Sharon Finn

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PROGRAM REVIEW
INSTITUTIONAL RESPONSE SHEET

Program Name: **Computer Information Science**

Thank you for your time and effort in preparing this Program Review. Your Executive Summary, with recommendations, has been sent to the Planning/Budget Committee and the Board of Trustees.

#1. Division Dean

Signature

Comments:

#2. Curriculum Committee Chair

Signature

Comments:

#3. College Vice President

Signature

Comments:

Pls see Comments Sheet