Basic Program Information

Computer Science

Department Name:

Division Name:

PSME

Program Mission(s):

AS in Computer Science: Prepare students for transfer to four year colleges, employment, professional enrichment, and promotions for entry, incumbent workers, and displaced workers.

AS in Enterprise Networking: To provide courses leading to employment, professional enrichment, and promotions for entry, incumbent workers, and displaced workers.

AS-T Degree in Computer Science: Provide students with the core CS courses required for students to receive guaranteed transfer to a CSU.

Please list all Program Review team members who participated in this Program Review:

Name	Department	Position
Michael Loceff	CS	Instructor (FT)
Elaine Haight	CS	Instructor (FT)
LaDawn Meade	CS	Instructor (FT)
Mike Murphy	CS	Instructor (FT)

Total number of Full Time Faculty:	4
Total number of Part Time Faculty:	11

Please list all existing Classified positions:
Example: Administrative Assistant I

List all Programs* covered by this review & check the appropriate column for program type:

Program Name	Certificate of Achievement Program	Associate Degree Program	Pathway Program
Computer Science AS		YES	
Enterprise Networking		YES	
Computer Science AS-T		YES	

*If you have a supporting program or pathway in your area for which you will be making resource requests, please analyze it within this program review (i.e. Integrated Reading and Writing, Math My Way, etc.) You will only need to address those data elements that apply.

Section 1: Data and Trend Analysis

a. Program Data:

Data will be posted on http://foothill.edu/staff/irs/programplans/programreviewdata.php for all measures except non-transcriptable completion. You must manually copy data in the boxes below for every degree or certificate of achievement covered by this program review.

Transcriptable Programs	2010-2011	2011-2012	2012-2013	% Change
Computer Science AS	6	6		
Enterprise Networking AS	8	9		

Please provide any non-transcriptable completion data you have available. Institutional Research does not track this data; you are responsible for tracking this data.

Non-Transcriptable Program	2010-2011	2011-2012	2012-2013	% Change
Example: Career Certificate				

b. Department Level Data:

	2010-2011	2011-2012	2012-2013	% Change
Enrollment				
Productivity (College Goal 2013-14: 535)	790	818	591	-27.8%
Success				
Full-time FTEF	12.7 * 49%	14.7 * 38%	8.6 * 33%	-41.6% * 35.5%
Part-time FTEF	12.7 * 51%	14.7 * 62%%	8.6 * 67%	-41.6% * 64.5%

c. Associate Degree Transfer (ADT)

There is a fall 2014 legislated deadline for approval of ADTs (AA-T/AS/T degrees). **If there Is a Transfer Model Curriculum (TMC) available in your program, you are *required* to offer an approved AA-T/AS-T.** Indicate the status of your program's ADT:

Check one	Associate Degree Transfer Status
YES	**State Approved**
	Submitted to CCCC
	Submitted to Office of Instruction
	In Progress with Articulation
	Planning Stage with Department
	Not Applicable

If you are required to offer an approved ADT and it has not been state-approved, please comment on the program's progress/anticipated approval date.

The courses are individually state approved for AS-T. The AS-T degree has been designed, meets all credit and content requirements and has been submitted to CCCC. Approval expected any day.

Using the prompts and the data from the tables above, provide a short, concise narrative analysis for each of the following indicators. If additional data is cited (beyond program review data sheet), please indicate your data source(s).

d. Enrollment trends: Over the last three years, is the enrollment in your program holding steady, or is there a noticeable increase or decline? Please comment on the data and analyze the trends.

Computer science and networking courses had been growing in the years leading up to 2011/12. Cutbacks and a switch from CIS to CS in 2012/13 resulted in an anticipated one-time enrollment decline. However, new courses in 2013/14, are already resulting in a 17% increase on Fall-over-Fall enrollment in 2013/14 vs. 2012/13, hinting at a recovery. **(More in Appendix 1, "Section 1.d Continued")**

e. Student Demographics: Please comment on the enrollment data, comparing the program-level data with the college-level data. Discuss any noticeable differences in areas such as ethnicity, gender, age and highest degree.

The new CS programs are distinct from the pre-2012/13 CIS counterparts, so there is no direct comparison. In 2012/13, CS established baselines for future trend analysis among and between ethnic groups. **(More in Appendix 1, "Section 1.e Continued")**

f. Productivity: Although the college productivity goal is 535, there are many factors that affect productivity, i.e. seat count/facilities/accreditation restrictions. Please evaluate and discuss the productivity trends in *your program*, relative to the college goal and any additional factors that impact productivity. If your productivity is experiencing a declining trend, please address strategies that your program could adopt to increase productivity.

In 2012/13, the CS department replaced the older, larger CTIS division. There were fewer courses and fewer instructors to teach those courses, but more students per course. The CS productivity was 682 compared to the overall PSME productivity of 521, Starting 2013/14, some 20+ new courses and several new part-time faculty will certainly result in increased enrollment, but productivity may actually be lower due to potentially smaller sections . **(More in Appendix 1, "Section 1.f Continued")**
~~(More in Appendix 1, "**Section 1.f Continued**")~~

Section 2: Student Equity and Institutional Standards

As part of an accreditation requirement, the college has established institution-set standards across specific indicators that are annual targets to be met and exceeded. Please comment on how these indicators compare at your program level and at the college level. (For a complete description of the institutional standard, please see the instructional cover sheet)

a. Institutional Standard for Course Completion Rate: 55%

Please comment on your program's course success data, including any differences in completion rates by student demographics as well as efforts to address these differences.

There are no prior years for CS, but comparison with PSME suggests that CS Success/Non-Success/Withdrawal (61/16/**23** %) are weaker than the division's overall numbers (65/20/**15** %). **(More in Appendix 1, "Section 2.a Continued")**

b. Institutional Standard for Degree Completion Number: 450

Has the number of students completing degrees in your program held steady or increased/declined in the last three years? Please comment on the data, analyze the trends, including any differences in completion rates by student demographics.

In the two years prior to 2012/13, CIS programs graduated 16 students per year. In 2012/13 the new CS program graduated (?Peter?). The expanded CS program of 2013/14 and new AS-T degree are expected to result in more graduates in 2014/15.

c. Institutional Standard for Certificate Completion Number (Transcriptable): 325

Has the number of students completing certificates in your program held steady, or increased/declines in the last three years? Please comment on the data, analyze the trends, including any differences in completion rates by student demographics.

In the two years prior to 2012/13, CIS gave 7 certificates per year. In 2012/13 the new CS department issued no certificates due to the near-term emphasis on transfer, and AS-T degrees. There may be little or no improvement in 2013-14, yet certificate-related courses may see large enrolments on their individual merits alone.

d. Institutional Standard for Transfer to four-year colleges/universities: 775

Based on the transfer data provided, what role does your program play in the overall transfer rates? Please comment on any notable trends or data elements related to your program's role in transfer.

In 2011/12, CIS programs graduated 13 students with transferrable degrees. In 2012/13 the new CS program graduated (?Peter?). The expanded CS program of 2013/14 and new AS-T degree are expected to result in more graduates in 2014/15.

Section 3: Core Mission and Support

The College's Core Missions are reflected below. Please respond to each mission using the prompts below.

a. Basic Skills: (English, ESLL and Math): For more information about the Core Mission of Basic Skills, see the Basic Skills Workgroup website: http://foothill.edu/president/basicskills.php
If your program is categorized as a basic skills program, please discuss current outcomes or initiatives related to this core mission and analyze student success through the core mission pathway.

N/A

If your program is NOT categorized primarily as a basic skills program, comment about how your program/classes supports Foothill's basic skills mission and students.

Every core CS course and most of the optional/recommended support courses for the programs include extended verbiage in English and Math exposure and practice.
(More in Appendix 1, "Section 3.a Continued")

b. Transfer: For more information about the Core Mission of Transfer, see the Transfer Workgroup website: http://foothill.edu/president/transfer.php
If your program is classified as a transfer program, please discuss current outcomes or initiatives related to this core mission and analyze student success through the core mission pathway.

Both the existing AS in CS and the new AS-T degree are addressed here. We have a pending AS-T degree in the chancellor's office awaiting final approval. The courses that comprise the degree have been approved for C-ID and are being taught currently. Once the AS-T degree is approved we will be issuing the degrees in 2014.
(More in Appendix 1, "Section 3.b Continued")

If your program is NOT categorized primarily as a transfer program, please comment about how your program/classes support Foothill's transfer mission and students.

c. Workforce: For more information about the Core Mission of Workforce, see the Workforce Workgroup website: http://www.foothill.edu/president/workforce.php
If your program is classified as a workforce program, please discuss current outcomes or initiatives related to this core mission and analyze student success through the core mission pathway.

Enterprise Networking Core Mission

To provide courses leading to employment, professional enrichment, and promotions for entry, incumbent workers, and displaced workers.

There are a wide variety of students taking our courses

1. Entry level with little or no previous job experience
2. Entry level with substantial job experience in other related or unrelated fields (Career Changers)
3. Incumbent workers who require continuing education to maintain current job or achieve promotion
4. Displaced working seeking reentry who need to have education and skill update

Outcomes

The required outcome is help enable the students to achieve their employment and career goals

Persons working in the IT field need constant exposure to changes in the field, this often cannot be obtained on the job.

Workforce Challenges

A. Effect of Rapid Technological Evolution
B. The heterogeneity of the student population
    1. We have students who have not completed high school and students with undergraduate and graduate degrees
    2. Many different cultural and language backgrounds
    3. Students with very poor study habits
    4. Students with significant non-academic responsibilities including family and employment.
C. Foothill is the only economically viable source of continuing education for many employed professionals. Graduate schools don't offer continuing education.

We will continue to support and expand our key educational partnerships

Cisco Networking Academy

1. IT Essentials
2. CCNA
3. CCNP

VMware

1. Data Center Virtualization (DCV)
2. Virtual Desktop Infrastructure (VDI)

EMC

1. Information Storage and management
2. Cloud Infrastructure and Services

3. Big Data and Analytics

Microsoft

1. Windows Server Operating Systems
2. Window Desktop Operating Systems
3. Microsoft Virtualization Platforms

Juniper

1. Routing, Switching, Security
2. Software Defined Networking

Initiatives

A. Cyber Security
    1. Decide how to expand our Cyber Security Offerings
B. Hiring and developing adjunct faculty to support our students
C. Developing a tightly knit tutorial staff and tutorial resources
D. Innovation is so quick in IT that the curriculum development cycle is often too long, perhaps we can develop "selected topics" courses.
E. Develop an Internship program
F. Develop a peer mentoring program

Create a new Advisory Board for Enterprise Networking

Membership

A. Representatives from IT Manufactures
    1. Cisco
    2. HP
    3. Dell
    4. VMware
    5. Microsoft
B. Representatives from large and small IT employers
    1. Insurance Company
    2. Public Employer
    3. Bank
    4. Retail
C. Representatives from IT Service Organizations

We must continue to discover ways to deploy our educational resources effectively

1. Use industry experts as guest speakers
2. Consider a weekend program
3. Additional uses for NETLAB and VMware Horizon/VIEW

Link to Business Department and the Entrepreneur Center

We could create one or more certificates jointly with the business department to expose the students to skill sets required for employment success

Innovations are needed for success

1. Internship Program
2. Tutorial Program
3. Peer Mentoring Program
4. Creating a more modular curriculum

If your program is NOT categorized as a workforce program, please comment about how your program/classes support Foothill's workforce mission and students.

Both the existing AS in CS, the Enterprise Networking and the new AS-T degree are addressed here. All programs' core courses are designed from top-to-bottom to correlate well with the Bay Area's technology jobs. Because of the large distance learning effort in CS, they also apply to technology jobs in other California and out-of-state high tech industries. **(More in Appendix 1, "Section 3.c Continued")**

Section 4: Learning Outcomes Assessment Summary

a. Attach 2012-2013 Course-Level – Four Column Report for CL-SLO Assessment from TracDat, please contact the Office of Instruction to assist you with this step if needed.

b. Attach 2012-2013 Program Level – Four Column Report for PL-SLO Assessment from TracDat, please contact the Office of Instruction to assist you with this step if needed.

Section 5: SLO Assessment and Reflection

Based on your assessment data and reflections, please respond to the following prompts.

a. **What curricular, pedagogical or other changes have you made as a result of your CL-SLO assessments?**

As a result of reflections on our many course-level SLOs (which are attached to the program-level SLOs), we adjust a variety of activities in all courses of all programs. **(More in Appendix 1, "Section 5.a Continued")**

b. How do the objectives and outcomes in your courses relate to the program-level student learning outcomes and to the college mission?

This is best answered by specific examples.

(More in Appendix 1, "Section 5.b Continued")

c. How has assessment of program-level student learning outcomes led to certificate/degree program improvements? Have you made any changes to your program based on the findings?

We have just completed the first year of the new CS program, but already, we see several opportunities to improve it. Some changes that we have started discussing for the coming two years are listed.

(More in Appendix 1, "Section 5.c Continued")

d. If your program has other outcomes assessments at the program level, comment on the findings.

N/A

e. What do faculty in your program do to ensure that meaningful dialogue takes place in both shaping and evaluating/assessing your program's student learning outcomes?

Each faculty participates in the design and update of the SLOs through tracDat logins. Since we have so many courses, each instructor specializes in a subset of the overall offerings, and that instructor fill-out the reflections for those courses. Finally, changes that such reflections might inspire are discussed in our department meetings or informally as we interact outside of class.

Section 6: Program Goals and Rationale

Program goals address broad issues and concerns that incorporate some sort of measurable action and connect to Foothill's core missions, Educational & Strategic Master Plan (ESMP), the division plan, and SLOs. Goals are not resource requests.

List Previous Program Goals from last academic year: check the appropriate status box & provide explanation in the comment box.

Goal/Outcome (This is NOT a resource request)	Completed? (Y/N)	In Progress? (Y/N)	Comment on Status
1. Transfer students as juniors into programs that award a bachelors degree in computer science and Networking	N	Y	Significant progress in updating AS degree and adding new AS-T degree.
2. Enable workers to develop professionally in their careers.	N	Y	Added 20+ new courses that address industry needs, and professional job preparation, and we are in the process of adding more.
3. Train students for new technician-level jobs	N	Y	We have added courses in quality assurance/software testing.

New Goals: Goals can be multi-year (in Section 7 you will detail resources needed)

Goal/Outcome (This is NOT a resource request)	Timeline (long/short-term)	How will this goal improve student success or respond to other key college initiatives?	How will progress toward this goal be measured?
1. Each student will be exposed to topics and courses which go beyond the minimum required for graduation in order to maximize their ability to succeed in the field of computer science.	Both	Incorporating this goal into individual courses will provide the student with a competitive advantage in the field, and addresses the key college mission of "excellence"	Assignments and courses which can be chosen by the students in the areas of their interest.

2. Improve retention	Both	by definition improved retention improves student success	data collected by the college

Section 7: Program Resources and Support

Using the tables below, summarize your program's unfunded resource requests. Refer to the Operations Planning Committee website: http://foothill.edu/president/operations.php for current guiding principles, rubrics and resource allocation information.

Full Time Faculty and/or Staff Positions

Position	$ Amount	Related Goal from Table in section 6 and how this resource request supports this goal.	Was position previously approved in last 3 years? (y/n)
FT CS Faculty		**Support student success and retention.**	**This position is to replace a FT CS Faculty that resigned. The number of FT will be 4 at that time again. The Dept is growing at over 40% over 2012-13.**

Unbudgeted Reassigned Time (calculate by % reassign time x salary/benefits of FT)

Has the program received college funding for reassign time in the last three years? (y/n)	**If yes, indicate percent of time.**
Has the program used division or department B-budget to fund reassign time? (y/n)	

Indicate duties covered by requested reassign time:

Responsibility	Estimated $	Related Goal from Table in	Est	% Time

		section 6 and how this resource request supports this goal.	**hours per month**	

One Time B Budget Augmentation

Description	**$ Amount**	**Related Goal from Table in section 6 and how this resource request supports this goal.**	**Previously funded in last 3 years? (y/n)**
Hire an instructional designer and videographer to supplement our online CS 1A course with videos and interactive quiz questions.	**$10,000**	Improve retention.	N
Provide stipend to adjunct for expanding mobile apps course offerings to include prerequisite courses directed precisely at mobile apps development.	**$5,000**	Improve retention, train students for new technician-level jobs	N (though funding was given for initially developing our existing courses.)

Ongoing B Budget Augmentation

Description	**$ Amount**	**Related Goal from Table in section 6 and how this resource request supports this goal.**	**Previously funded in last 3 years? (y/n)**
Hire online instructional assistants (I/A) who can field daily technical and non-technical and basic questions, administer group projects and similar responsibilities of an I/A.	$1600 / mo per T/A	Improve retention.	N
Provide stipend to adjunct for	$2000 /	Train students for new	N (though funding

updating mobile apps course materials annually. This field is changing so quickly.	year	technician-level jobs	was given for initially developing the courses.)

Facilities and Equipment

Facilities/Equipment Description	$ Amount	Related Goal from Table in section 6 and how this resource request supports this goal.	Previously funded in last 3 years? (y/n)
6 1941 Routers	$7200	Train students for new technician-level jobs	No
6 2960 Switches	$4000	Train students for new technician-level jobs	No
2 HP Servers	$16000	Train students for new technician-level jobs	Yes

Section 8: Program Review Summary

Address the concerns or recommendations that were made in prior program review cycles, including any feedback from Dean/VP, Program Review Committee, etc.

Recommendation	Comments
1.	

a. After reviewing the data, what would you like to highlight about your program?

The Computer Science programs are rapidly growing with 20+ new courses that address professional job preparation for current and emerging industry needs. We are in the process of adding more courses as part of the already significant progress we have made in updating our AS degree and adding a new AS-T degree. The strength of these new courses and programs comes from the design approach we are taking: all programs' core courses are designed from top-to-bottom to correlate well with the Bay Area's technology. Because of the large distance learning effort in CS, they also apply to technology jobs in other California and out-of-state high tech industries. All of these efforts are focused on building a world-class Computer Science department that contributes significantly to the college mission of providing educational excellence to diverse students seeking transfer, career preparation and enhancement.

Section 9: Feedback and Follow Up

This section is for the Dean to provide feedback.

a. Strengths and successes of the program as evidenced by the data and analysis:

1. The small team of FT Faculty have created 20 new courses over the academic year. This has been very impressive.
2. The software team had the CS AS-T approved before most CC in Calif. They modified courses and collaborated with faculty in other disciplines to reduce the unit count.
3. The success rates vary from course to course. As students progress in a sequence they are more successful. Since there is no prerequisite to many of the entry level courses, having a 30% withdrawal rate is expected.
4. They have created a very effective workforce advisory team.
5. There is the potential for CS enrollment will double in next 4 years.

b. Areas of concern, if any:

1. Being able to continue growth will require additional faculty (FT & PT) in many of the unique areas. I support the hiring of a new FT CS Faculty to replace the one that is resigning.
2. The need for computer classrooms to support the new classes. Need to create a virtual system where any class can be taught anywhere there are computers.
3. The network classes have a high failure and withdrawal rate. These classes are also expensive to support.
4. The FT faculty don't have enough capacity to create all the new potential courses. Many of the new courses require unique skills, often found in industry.

c. Recommendations for improvement:

1. Do heavy recruitment from industry for new PT and FT faculty.
2. Be able to fund PT faculty to develop new courses in targeted subject areas.
3. The network courses need to be reviewed and evaluated FT Faculty and external advisors.
4. Create state-of-art software infrastructure for software classes.

d. Recommended next steps:

__X_ Proceed as planned on program review schedule
___ Further review/Out of cycle in-depth review

Upon completion of section 9, the Program Review should be returned to department faculty and staff for review, then submitted to the Office of Instruction and Institutional Research for public posting. See timeline on Program Review Cover Sheet.

Appendix 1: Continuation/Overflow Answers

Section 1.d Continued:

Online vs. Face-to-Face Enrollment Comparison

Some hints at where we can grow come from the percentage of online course enrollment in CS in comparison to similar numbers for the entire PSME division. Here are three years of PSME data, and the first year of the CS data. We are

% Enrollment That Comes From Fully On-Line Instruction

	2010/11	2011/12	2012/13
PSME	19%	23%	12%
CS			53%

The table suggests that CS, even in its weakest year (due to the cutbacks) had a much higher percentage of its enrollment online than all other PSME departments.

Future Strategies

This is a clue to where we can best leverage our future enrollment figures: CS students are online, and that's where we should continue to grow our classes.

Section 1.e Continued:

CS vs. College Demographics

Computer science, and indeed PSME in general, draws a different demographic breakdown than the overall college demographics. However, where PSME seems to draw a higher percentage of Asian students, and slightly lower % of Latino/a students (to cite two obvious differences), CS extends that bias even further. Indeed, nearly half of all CS students declare themselves to be Asian, significantly more than PSME and Foothill in general.

% Enrollment That Comes From Fully On-Line Instruction

	Foothill	PSME	CS
African American	5%	4%	2%
Asian	26%	37%	47%
Decline to State	9%	8%	8%
Filipino	4%	4%	2%

Latino/a	20%	17%	8%
Native American	1%	1%	1%
Pacific Islander	1%	1%	1%
White	33%	28%	32%

Future Strategies

The table suggests that CS is more successful than either PSME or Fooothill at attracting Asian students, while being less successful in other ethic groups such as African American or Latino/a. This gives us a direction in which we can go. There are two aspects:

1. Recruiting students
2. Retaining students

While recruiting students of varied ethnicities may present a difficult challenge, retaining students in targeted ethnic groups may be something we can address in a simpler manner. By hiring TAs and tutors who are themselves declared to be in the various targeted groups, we may be able to increase accessibility for them, and thus see an uptick in retention and success in the respective groups.

Section 1.f Continued:

Challenges for Productivity in Online Classes

As the number of online students increases, two factors play a role in productivity: students withdrawing because of lack of online support system, and students being dropped due to honor code violations. Each of these problems has a solution, but it requires staff resources. Staff can assist students in the first three weeks of a quarter (indeed all quarter, but the first three weeks is when productivity numbers can be eroded) by providing extra tutorials, Q and A, early signs of unauthorized collaboration, and extra pre-grading screening of student work. All this would translate into higher numbers of students making it to the census dates which determine productivity.

Future Strategies

The strategy to continue productivity growth started in the early part of 2013/14 is to leverage online courses, attempt to add staff support for online instructors, and an active role of the PSME tutorial center to allow for fewer early quarter drops and better overall retention.

Section 2.a Continued:

The withdrawal rate accounts for the biggest problem in CS. It may be attributable to the higher level of course content and fewer instructors compared with the older CIS courses. Now that initial curriculum work load is levelling out, we expect higher success and retention.

Online Aspects

Comparison of online CS success with PSME suggests that CS Success/Non-Success/Withdrawal (60/10/**30** %) are roughly the same as division's Online overall numbers (60/16/**25** %), with the difference being that CS students who did not succeed tended to do so by withdrawing compared with other PSME disciplines in which the non-successful tended to do so by receiving a failing grade. If CS can retain the students, they usually pass the course. Our job must be in retention.

Ethnic Aspects

Ethic success statistics are still unclear, with ethnic groups showing a much higher success than their enrollment figures

% Enrollment That Comes From Fully On-Line Instruction

	Enrollment	Success
African American	2%	32%
Asian	47%	64%
Decline to State	8%	69%
Filipino	2%	29%
Latino/a	8%	45%
Native American	1%	86%
Pacific Islander	1%	30%
White	32%	6%

This suggests that if we can attract more targeted groups, we can be highly effective and promoting the individuals in those groups through graduation and beyond.

Future Strategies

In order to produce more success, CS has to improve its retention. Withdrawing or being dropped comprises a higher percentage of non-succeeders than does completing the course with a failing grade. A reasonable approach to the problem would be to add support in the form of TAs, pre-graders, and tutors in the department or the PSME center.

Section 3.a Continued:

CS Support for English

In all core CS course outlines of records and most support courses, under "Examples of Required Reading and Writing and Outside of Class Assignments", we give multiple examples of how reading and writing should be incorporated into every aspect of the course. A few examples are "Reading the supplied handouts and modules averaging 10 pages

per week" and "Writing technical prose documentation that supports and describes the programs".

CS Support for Math

In all core CS course outlines of records and most support courses, under "Course Objectives", we state the requirement that the student "solve problems that have origins in a variety of disciplines including math … " and under course content, we note that "Applications used throughout course in selected areas" of which the number one example is "Math".

Section 3.b Continued:

Once the AS-T degree is approved we will be issuing the degrees in 2014.

Mission and Objectives Relating to Transfer of all CS Courses

Students who complete the "Associate in Science in CS for Transfer" Degree will be ensured preferential and seamless transfer status to local CSUs for CS majors and majors in related disciplines. The Associate in Science in CS for Transfer Degree requirements will fulfill the lower division major requirements at many local CSUs.

This correlates with the College Mission to "offer educational excellence to diverse students seeking transfer".

Both AS-T Degree and AS in Computer Science Degree

Over the past 24 months the department has worked continuously with our articulation department and VP of education to be certain that our new courses comply with all criteria for transfer to CSUs. With the awareness that a large portion of our transfer students are headed for UCs, private universities, or don't know where they will end up, we have designed multiple pathways for a student to meet the AS-T requirements and still satisfy the transfer requirements of their second or third choice transfer institution. In particular, we have both Java and C++ pathways to the AS-T degree. We also have a near identical overlap in our AS-T degree and previous AS in CS degree, allowing dual conferral with little or no additional courses or units.

Section 3.c Continued:

Mission and Objectives Relating to Workforce of all CS Courses

We have annual advisory committee meetings with representatives from companies like Apple, Facebook, Google, Linked In, and others, to make sure our courses also provide content that is relevant to the Foothill College Mission to provide "career preparation and enhancement".

Section 5.a Continued:

So far, during and after 2012/13, the first year of the new CS programs, we have made changes to the CORs of several courses based on our reflections of the course-level SLOs (as well as other factors like transferability and advisory committee recommendations).

In many cases we found that no change in the COR, nor in the individual instructor implementation of the COR was warranted. Example: "This SLO was measured by lab assignment 3 of the computer labs. The average scores was 85%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students."

In some cases we noted that, despite meeting targets for successful students, there were a significant number of withdrawals: " these results don't reflect an attrition of about 20% of the students (drop-outs) by the fourth week of the quarter." In these cases, we

1. added a new course CS 49, which is a place for dropped or unsuccessful students to fall back on and get slower-paced instruction.
2. Changed certain aspects from some COR (as evidenced by many of our COR changes in the last year), or
3. left the COR alone and added individual instructional techniques. One example is the institution of a GYBB (Got Your Back Buddy) system in three sections of the core CS curriculum.

Section 5.b Continued:

Course-Level SLOs Correlating with Program-Level SLOs

One of the program-level SLOs is: "The successful student will be able to develop quality, maintainable software using current tools and object oriented design techniques."

Here are course-level SLOs that directly support the above program-level SLO:

- CS 1A: "A successful student will be able to use object-oriented programming techniques to design and implement a clear, well-structured Java program."
- CS 2A: "A successful student will be able to write and debug C++ programs which make use of inheritance [an object-oriented tool]."
- CS 10: "The student will demonstrate the ability to analyze the assembly language instructions generated by a C, C++ or Java program."
- CS 40A: "Design a computer program that employs the Model/View/Controller pattern."

Program-Level SLOs Correlating with College Mission

One of the institutional missions is to provide "career preparation and enhancement".

Here is a program-level SLOs that directly support the this mission:

- "Each student will be exposed to topics and courses which go beyond the minimum required for graduation in order to maximize their ability to succeed in the field of computer science."

Another institutional mission is to "offer educational excellence to diverse students seeking transfer".

Here is a program-level SLOs that directly support the this mission:

- The student will work cooperatively with other students of all levels and backgrounds, lending support to, and getting support from, other members of the college's uniquely diverse and experienced student population.

Section 5.c Continued:

As enrollment attrition (drop/withdrawal) is one of the biggest factors in our course, we have discussed ways to improve. One measure has already been implemented: the addition of CS 49, a remedial introduction that would only be needed by students who have problems with the CS 1A or CS 2A courses.

A second is the trial use of a "buddy-system" which has, in the first quarter of 2013/14 contributed to reduced drop rates by 5 – 10% in three sections. This could be implemented globally, but would require staff to help instructors administer the system, which involves time, but not significant technical ability.

Plans for future improvements include:

- The addition of audio/video to online or hybrid classes.
- A sabbatical study by one of our full time instructors recommends developing a combined face-to-face and on-line effort which is more flexible than the existing hybrid courses. This proposal would involve one course to be developed jointly for this kind of presentation, and there is some evidence that the flexibility might improve the student retention. A year-long effort in 2014/15 could result in the design of this course for future years.
- MOOC-like courses which we call "OAK"s (Online Accredited Kiosks). These provide extra non-faculty staff to be available to answer questions and help with pre-grading screens, to enable each instructor to handle more students while giving each student better attention than is currently possible.
- Use of staff to assist in managing the online students' needs beyond what instructors can provide, especially with the increased enrollment. One staff member, for example, could administer the GYBB (buddy) system to keep students connected in support pairs, or manage group project, while the instructor is free to grade and answer public questions. Such staff support would be applicable across different courses.

Unit Course Assessment Report - Four Column

Foothill College

Department - Computer Science (C S)

Mission Statement: To provide an educational pathway to careers in computer science technology and research. To make computer technology accessible to students from all backgrounds. To provide a conduit between our students and both universities and companies, so that the training and learning that they acquire at Foothill can be leveraged to pursue professional and/or advanced research positions.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Computer Science (C S) - C S 10 - COMPUTER ARCHITECTURE & ORGANIZATION - Compilation of C++ or Java to assembly language - The student will demonstrate the ability to analyze the assembly language instructions generated by a C, C++ or Java program. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignment the examines and analyzes the code generated by a C, C++ or Java program. **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	06/30/2013 - This SLO was measured by lab assignment 3 of the computer labs. The average scores was 85%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 10 - COMPUTER ARCHITECTURE & ORGANIZATION - Microprocessor Architecture - The student will demonstrate knowledge of the architecture of a microprocessor including the use of registers, the program counter, and the arithmetic logic unit. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Test that includes questions about microcomputer architecture components. **Assessment Method Type:** Pre/Post Test **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	06/30/2013 - This SLO was measured by questions on the midterm and final exams. The average score was 72%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 1A - OBJECT-ORIENTED PROGRAMMING			

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
METHODOLOGIES IN JAVA - Java Control Structures and Methods - A successful student will be able to write and debug Java programs which make use of the fundamental control structures and method-building techniques common to all programming languages. Specifically, the student will use data types, input, output, iterative, conditional, and functional components of the language in his or her programs. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing the control structures and methods in the program. **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	03/31/2013 - This SLO was measured by lab assignments 2,3, 4 and 5 of the computer labs. The average scores were between 93%, 90%, 88% and 83%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** We will continue to use this SLO	
Department - Computer Science (C S) - C S 1A - OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN JAVA - Java OOP Design - A successful student will be able to use object-oriented programming techniques to design and implement a clear, well-structured Java program. Specifically, the student will use and design classes and objects in his or her programs. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing the classes and objects in the program **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	03/31/2013 - This SLO was measured by lab assignments 6, 7, 8 and 9 of the computer labs. The average scores were between 80%, 83%, 78% and 72%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** SLO was not quite as successful as the other SLO, but was still very good - we met our goal. No change recommended for the coming year.	
Department - Computer Science (C S) - C S 1B - INTERMEDIATE SOFTWARE DESIGN IN JAVA - Java Inheritance - A successful student will be able to write and debug Java programs which make use of inheritance, i.e., the "is a" relationship, common to all	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing inheritance in the program.	06/18/2013 - Inheritance and OOP were tested from week 5 onward, and students received the equivalent of an 8 or better at the rate of about 90% of enrolled members. **Result:** Target Met	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
languages. Specifically, the student will define base and derived classes and use common techniques such as method chaining in his or her programs. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	**Year This Assessment Occurred:** 2012-2013 03/31/2013 - This SLO was measured by lab assignments 6, 7 and 8 of the computer labs. The average scores were 84%, 80% and 97%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the students (drop-outs) by the fourth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** T/A for the course would be very useful if future budgets allow it.	
Department - Computer Science (C S) - C S 1B - INTERMEDIATE SOFTWARE DESIGN IN JAVA - Basic Java Abstract Data Types - A successful student will be able to use the Java environment to define the basic abstract data types (stacks, queues, lists) and iterators of those types to effectively manipulate the data in his or her program. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing a variety of abstract data types in the program. **Assessment Method Type:** Observation/Critique	06/18/2013 - Abstract Data Types were tested from week 8 onward, and students received the equivalent of an 7 or better at the rate of about 90% of enrolled members. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 03/31/2013 - This SLO was measured by lab assignments 8 and 9 of the computer labs. The average scores were 97% and 91%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the students (drop-outs) by the fourth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		Resource Request: T/A for the course would be very useful if future budgets allow it.	
Department - Computer Science (C S) - C S 1B - INTERMEDIATE SOFTWARE DESIGN IN JAVA - Java Generics - A successful student will be able to define and use Java generics to make their data and algorithms work with a variety of data types. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing a variety of Java generics in the program. **Assessment Method Type:** Observation/Critique	06/18/2013 - Generics were tested from week 8 onward, and students received the equivalent of an 7/10 or better at the rate of about 80% of enrolled members. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
		03/31/2013 - This SLO was measured by lab assignments 6. The average scores was 84%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This SLO seems well met and no action needed for the coming year.	
Department - Computer Science (C S) - C S 1C - ADVANCED DATA STRUCTURES & ALGORITHMS IN JAVA - Time Complexity in Java - The successful student will be able to analyze the time complexity of a variety of algorithms and data structure access techniques and choose the best algorithm and/or data structure for the project at hand. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, measuring the time complexity of various sort, search or merge algorithms in a program. **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	03/31/2013 - This SLO was measured by lab assignments 3, 5, 7 and 8 of the computer labs. The average scores were between 98%, 75%, 92% and 97%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 30% of the students (drop-outs) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:**	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Course-Level SLO Status: Active		The SLO was successful as far as the students who stayed in the course. We will continue to keep the SLO in-tact, but we should attempt to have more support for the students than can be provided by the instructor, alone. Tutors or class TAs would help. **Resource Request:** T/A for the course would be very useful if future budgets allow it.	
Department - Computer Science (C S) - C S 1C - ADVANCED DATA STRUCTURES & ALGORITHMS IN JAVA - Advanced Data Structures - The successful student will be able to write and incorporate balanced trees, hash tables, directed graphs and priority queues in his or her software. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignments that includ debugged source code and some evidence of successful program runs, demonstrating the use of each advanced data structure covered in the course. **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	03/31/2013 - This SLO was measured by lab assignments 1, 2, and 9 of the computer labs. The average scores were between 94%, 79%, and 85%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 30% of the students (drop-outs) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** The SLO was successful as far as the students who stayed in the course. We will continue to keep the SLO in-tact, but we should attempt to have more support for the students than can be provided by the instructor, alone. Tutors or class TAs would help. **Resource Request:** T/A for the course would be very useful if future budgets allow it.	
Department - Computer Science (C S) - C S 2A - OBJECT-ORIENTED PROGRAMMING	**Assessment Method:**	03/31/2013 - This SLO was measured by lab assignments 2, 3, 4 and 5 of the computer labs.	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
METHODOLOGIES IN C++ - C++ Control Structures and Methods - A successful student will be able to write and debug C++ programs which make use of the fundamental control structures and method-building techniques common to all programming languages. Specifically, the student will use data types, input, output, iterative, conditional, and functional components of the language in his or her programs. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	Programming assignment that includes debugged source code and some evidence of a successful program run, testing the control structures and methods in the program. **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	The average scores were between 97%, 95%, 91% and 98%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** Extremely positive results for this SLO. Will keep in place for coming year.	
Department - Computer Science (C S) - C S 2A - OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN C++ - C++ OOP Design - A successful student will be able to use object-oriented programming techniques to design and implement a clear, well-structured C++ program. Specifically, the student will use and design classes and objects in his or her programs. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 10/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing the classes and objects in the program. **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	03/31/2013 - This SLO was measured by lab assignments 6, 7, 8 and 9 of the computer labs. The average scores were between 85%, 93%, 87% and 80%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** Strong results indicating a continued use of this SLO for the coming year.	
Department - Computer Science (C S) - C S 2B - INTERMEDIATE SOFTWARE DESIGN IN C++ - C++ Inheritance - A successful student will be able to write and debug C++ programs which make use of inheritance, i.e., the "is a" relationship, common to all OOP languages. Specifically, the student	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing inheritance in the program. **Assessment Method Type:**	03/31/2013 - This SLO was measured by lab assignments 6, 7 and 8 of the computer labs. The average scores were 84%, 80% and 97%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
define base and derived classes and use common techniques such as method chaining in his or her programs. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	students (drop-outs) by the fourth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** T/A for the course would be very useful if future budgets allow it.	
Department - Computer Science (C S) - C S 2B - INTERMEDIATE SOFTWARE DESIGN IN C++ - Basic C++ Abstract Data Types - A successful student will be able to use the C++ environment to define the basic abstract data types (stacks, queues, lists) and iterators of those types to effectively manipulate the data in his or her program. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing a variety of abstract data types in the program. **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	03/31/2013 - This SLO was measured by lab assignments 8 and 9 of the computer labs. The average scores were 97% and 91%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the students (drop-outs) by the fourth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** T/A for the course would be very useful if future budgets allow it.	
Department - Computer Science (C S) - C S 2B - INTERMEDIATE SOFTWARE DESIGN IN C++ - C++ Templates - A successful student will be able to define and use C++ templates to make their data and algorithms work with a variety of data types. (Created By Department - Computer Science (C S)) **Start Date:** 09/23/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:**	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, testing a variety of C++ templates in the program. **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	03/31/2013 - This SLO was measured by lab assignments 6. The average scores was 84%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Active			
Department - Computer Science (C S) - C S 2C - ADVANCED DATA STRUCTURES & ALGORITHMS IN C++ - Time Complexity in C++ - The successful student will be able to analyze the time complexity of a variety of algorithms and data structure access techniques and choose the best algorithm and/or data structure for the project at hand. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignment that includes debugged source code and some evidence of a successful program run, measuring the time complexity of various sort, search or merge algorithms in a program. **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	06/18/2013 - This was measured in week 4 (lab #3) and selected labs thereafter. Students consistently computed accurate time complexity and compared their predictions with lab results. More than 80% of the students - approximately 90% - demonstrated understanding of this concept and its use in evaluating algorithms. The only area of improvement was in overall retention. The course is difficult and had a large drop-out rate, not due to this rubric, specifically. We continue to work on that aspect. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 2C - ADVANCED DATA STRUCTURES & ALGORITHMS IN C++ - Advanced Data Structures - The successful student will be able to write and incorporate balanced trees, hash tables, directed graphs and priority queues in his or her software. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **End Date:** 09/23/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Programming assignments that includ debugged source code and some evidence of successful program runs, demonstrating the use of each advanced data structure covered in the course. **Target for Success:** 80% of the students will get a score of 7 or better on a 10 point rubric.	06/18/2013 - Lab assignments #4, #5, #6 and #9 measure this rubric. Of those students who were in the course during each of those weeks (there was attrition due to overall difficulty with the course, not this rubric specifically) 80% or more of the students did demonstrate a very high degree of competence in these data structures. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 50A - NETWORK FUNDAMENTALS (CCNA) - Network Communications - The student will demonstrate an understanding of communications between two hosts on an IP network connected by an arbitrary collection of routers and switches. The student will	**Assessment Method:** The student will successfully design and configure a network **Assessment Method Type:** Observation/Critique **Target for Success:** 80% of the students will successfully	06/30/2013 - This SLO was measured by lab assignments 6 of the computer labs. The average scores were between 90%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 40% of the students	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
perform a lab experiment requiring them to analyze the flow of data between two host using Wireshark or Packet Tracer. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Course-Level SLO Status:** Active	complete the lab exercise	(drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 50A - NETWORK FUNDAMENTALS (CCNA) - OSI Model - The student demonstrate understanding of the role of IP addressing in the TCP/IP Network Reference Model in Networking. (Created By Department - Computer Science (C S)) **Course-Level SLO Status:** Active	**Assessment Method:** The student will be tested in chapter 6 exam on their understanding of IP address and subnet masks through the use of a multiple choice test. **Assessment Method Type:** Pre/Post Test **Target for Success:** Target for Success: 80% of the students will get a score of 70 or better on a 100 point rubric.	11/10/2013 - This SLO was measured by questions on the chapter 6 exam. The average score was 85%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 50B - IP ROUTING PROTOCOL FUNDAMENTALS (CCNA) - Routing Protocols - The student will demonstrate the ability to configure the interior gateway routing protocols RIP, RIPv2, OSPF, and EIGRP. (Created By Department - Computer Science (C S)) **Start Date:** 09/24/2012 **Course-Level SLO Status:** Active	**Assessment Method:** The students will complete laboratory experiments design to demonstrate their understanding and ability to configure and debug network configurations employing RIP, RIPv2, OSPF, and EIGRP. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will get a score of 7 or better on a 10 point rubric in the Lb experiments.	06/30/2012 - This SLO was measured by lab assignments 3, 4, 7, and 11 of the computer labs. The average scores were between 80%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 25% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 50B - IP ROUTING PROTOCOL FUNDAMENTALS (CCNA) - Selection of Interior Gateway Routing Protocols - The	**Assessment Method:** The student will perform a laboratory experiment requiring them to design a layer 3 network to satisfy specific size and	06/30/2013 - This SLO was measured by lab assignments 11 of the computer labs. The average scores were between 90%, respectively. Careful analysis of the individual assignments	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
student will demonstrate the process of selecting the appropriate routing protocol for specific network requirements. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/30/2012 **Course-Level SLO Status:** Active	performance requirements. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will get a score of 7 or better on a 10 point rubric.	revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 25% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 50C - THE LOCAL AREA NETWORK: ETHERNET & WIRELESS NETWORKS - LAN Design - The student will demonstrate knowledge of the Composite LAN Design Model. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **Course-Level SLO Status:** Active	**Assessment Method:** The students will be tested in a multiple choice exam which requires them to demonstrate knowledge of the Composite LAN Design Model. They will be asked to demonstrate knowledge of the purpose and use of each layer and of the tools and designed techniques to ensure reliability, availability, and security in the network, **Assessment Method Type:** Pre/Post Test **Target for Success:** Target for Success: 80% of the students will get a score of 70 or better on a 100 point rubric.	06/30/2013 - This SLO was measured by questions on the chapter 1 exam. The average score was 83%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 06/30/2013 - This SLO was measured by questions on the chapter 5 exam. The average score was 78%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 50D - INTRODUCTION TO WIDE AREA NETWORKS, NETWORK SECURITY & IP ADDRESSING SERVICES - WAN Design - The student will demonstrate knowledge of the design and configuration of Wide Area Networks utilizing point-to-point (PPP) and point-to-multipoint (Frame Relay) topologies. (Created By Department - Computer Science (C S))	**Assessment Method:** The student will be given a specific communications requirement and asked to determine the appropriate protocol to deploy and then to design, deploy, and verify the configuration of the network. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will	06/30/2013 - This SLO was measured by lab assignments 2 & 3 of the computer labs. The average scores were between 90%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 40% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:**	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Assessment Cycles: End of Academic Year **Start Date:** 09/24/2012 **Course-Level SLO Status:** Active	get a score of 7 or better on a 10 point rubric.	Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 50D - INTRODUCTION TO WIDE AREA NETWORKS, NETWORK SECURITY & IP ADDRESSING SERVICES - Network Security - The student will demonstrate the ability to secure a local area and wide area network. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **Course-Level SLO Status:** Active	**Assessment Method:** The students will be tested using a multiple choice exam designed to determine their knowledge of current security requirements and the deployment of secure LANs and WANs. **Assessment Method Type:** Pre/Post Test **Target for Success:** Target for Success: 80% of the students will get a score of 70 or better on a 100 point rubric.	06/30/2013 - This SLO was measured by questions on the chapter 4 exam. The average score was 86%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 52A - ADVANCED IP ROUTING PROTOCOLS & SERVICES (CCNP) - Route Maps - The student will demonstrate the use of route maps. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **Course-Level SLO Status:** Active	**Assessment Method:** The student will perform a laboratory experiment involving route filtering for redistribution where there will use a route map to select the routes. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will get a score of 7 or better on a 10 point rubric.	09/30/2012 - This SLO was measured by lab assignments 5 of the computer labs. The average scores was 90%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 52A - ADVANCED IP ROUTING PROTOCOLS & SERVICES (CCNP) - Border Gateway Protocol (BGP) - The student will demonstrate knowledge of the Border Gateway Protocol (Created By	**Assessment Method:** The students will be tested using a multiple choice assessment which is designed to determine their knowledge of both eBGP and iBGP. The assessment will cover when to use BGP, the differences between eBGP	11/10/2013 - This SLO was measured by lab assignment 6 of the computer labs. The average scores were between 100%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **Course-Level SLO Status:** Active	and iBGP, and other details of the protocol. **Assessment Method Type:** Pre/Post Test **Target for Success:** Target for Success: 80% of the students will get a score of 70 or better on a 100 point rubric.	students. However, these results don't reflect an attrition of about 20% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 52B - ADVANCED SWITCHING & CAMPUS LAN DESIGN (CCNP) - Private VLANs - The student will demonstrate the application and configuration of private VLANs. (Created By Department - Computer Science (C S)) **Start Date:** 06/30/2013 **Course-Level SLO Status:** Active	**Assessment Method:** The student will perform a laboratory experiment requiring the use of private VLANs for traffic separation. **Target for Success:** Target for Success: 80% of the students will get a score of 7 or better on a 10 point rubric.	09/30/2013 - This SLO was measured by lab assignment 6 of the computer labs. The average scores were between 90%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 52B - ADVANCED SWITCHING & CAMPUS LAN DESIGN (CCNP) - First Hop Redundancy Protocols - The student will demonstrate the knowledge of three first-hop redundancy protocols, HSRP, GLBP, and VRRP, (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Course-Level SLO Status:** Active	**Assessment Method:** The student will perform laboratory experiments and will be ask to choose the most appropriate protocol for the problem presented. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will get a score of 7 or better on a 10 point rubric.	11/10/2013 - This SLO was measured by lab assignment 5 of the computer labs. The average scores was 80%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 52C - ADVANCED NETWORK	**Assessment Method:** The student will be given a configured	11/10/2013 - This SLO was measured by lab assignment 4 of the computer labs. The average	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
TROUBLESHOOTING (CCNP) - Troubleshooting connectivity problems in a campus LAN - The student will demonstrate the ability to describe the methodology of troubleshooting and correcting connectivity problems in a campus LAN. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **Course-Level SLO Status:** Active	campus LAN topology and told to test connectivity among all of the LANs and make the necessary changes to the topology to ensure connectivity. The student will also be told to force a specific switch to be the STP root switch. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will get a score of 7 or better on a 10 point rubric.	scores was 90%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 15% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 52C - ADVANCED NETWORK TROUBLESHOOTING (CCNP) - BGP Attributes - The student will demonstrate the use of BGP attributes to influence the BGP route selection decision. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **Course-Level SLO Status:** Active	**Assessment Method:** The student will be given a configured topology which is not choosing the correct routes for packet forwarding. The student will be required to troubleshoot the problem. The solution to the problem will require the student to modify the BGP attributes of the route. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will get a score of 7 or better on a 10 point rubric.	06/30/2013 - This SLO was measured by lab assignment 5 of the computer labs. The average scores was 80%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 15% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 54A - STORAGE AREA NETWORKS - Network Attached Storage - The student will demonstrate the use of Network Attached Storage in a data center environment (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year	**Assessment Method:** The student will perform a laboratory experiment requiring the configuring of a Network Attached Server (NAS) and connecting to it and sharing files from both Windows and Linux servers. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will	11/10/2013 - This SLO was measured by lab assignment 4 of the computer labs. The average scores was 80%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 100% of the students. However, these results don't reflect an attrition of about 15% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:**	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Start Date: 09/24/2012 **Course-Level SLO Status:** Active	get a score of 7 or better on a 10 point rubric.	Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 54A - STORAGE AREA NETWORKS - Data Backup and Recovery - The student will demonstrate the knowledge of recovery time option (RTO) and recovery point option (RPO) in backup and recovery. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Course-Level SLO Status:** Active	**Assessment Method:** The students will take a multiple choice assessment requiring them to demonstrate their knowledge of recovery time option (RTO) and recovery point option (RPO) and to use the appropriate backup and recovery technologies to meet the objectives. **Assessment Method Type:** Pre/Post Test **Target for Success:** Target for Success: 80% of the students will get a score of 70 or better on a 100 point rubric.	11/10/2013 - This SLO was measured by questions on the midterm and final exams. The average score was 82%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 15% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 54B - VMWARE VSPHERE INSTALL, CONFIGURE, MANAGE - vMotion - The student will demonstrate the use of vMotion in a virtual infrastructure environment. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 01/07/2013 **End Date:** 09/27/2013 **Course-Level SLO Status:** Active	**Assessment Method:** The student will configure to two ESXi hosts using Virtual Center to use vMotion to move a running virtual machine from one host to the other automatically. **Assessment Method Type:** Observation/Critique **Target for Success:** Target for Success: 80% of the students will get a score of 7 or better on a 10 point rubric.	11/10/2013 - This SLO was measured by lab assignment 6 of the computer labs. The average scores was between 90%. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Computer Science (C S) - C S 54B - VMWARE VSPHERE INSTALL, CONFIGURE, MANAGE - Distributed Virtual Switches - The student will demonstrate knowledge of the configuration and use of Virtual Distributed switches in a virtual	**Assessment Method:** The student will take a multiple choice assessment which will determine the student's knowledge of VIrtual Distributed Switches, when to deploy them, how to configure them and and to verify their	11/10/2013 - This SLO was measured by a question on the Final Exam. The average Average scores was 92, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. **Result:**	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
infrastructure. (Created By Department - Computer Science (C S)) **Assessment Cycles:** End of Academic Year **Start Date:** 01/07/2013 **End Date:** 09/27/2013 **Course-Level SLO Status:** Active	functionality. **Assessment Method Type:** Pre/Post Test **Target for Success:** Target for Success: 80% of the students will get a score of 70 or better on a 100 point rubric.	Target Met **Year This Assessment Occurred:** 2012-2013 11/10/2013 - This SLO was measured by lab assignment 5 of the computer labs. The average scores were between 90%, respectively. Careful analysis of the individual assignments revealed, we met the 7/10 goal on more than 80% of the students. However, these results don't reflect an attrition of about 20% of the students (drops/withdrawals) by the sixth week of the quarter. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	

Unit Assessment Report - Four Column

Foothill College

Program (PSME-C S) - Computer Science AS

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Program (PSME-C S) - Computer Science AS - Software Development Expertise - The successful student will be able to develop quality, maintainable software using current tools and object oriented design techniques. **Year PL-SLO implemented:** End of Academic Year **Start Date:** 09/19/2012 **End Date:** 06/30/2016 **SLO Status:** Active	**Assessment Method:** The development of a program that follows a given set of style guidelines and satisfies the given user requirements. The student must demonstrate that the program meets the requirements, and must be prepared to answer questions about why she solved the problem the way she did. **Assessment Method Type:** Class/Lab Project **Target:** 100% of students awarded this degree must pass the assessment.	06/18/2013 - Based on course SLO reflection and evaluation of software submitted by students in the required core courses for this program, students who complete the final required programming courses (CS 1C or 2C) all demonstrate a high degree of software development expertise using object oriented design and current tools. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Program (PSME-C S) - Computer Science AS - Ability to design data structures - The successful student will be able to design a complex program using different types of data structures and their corresponding algorithms. **Start Date:** 09/19/2012 **End Date:** 06/29/2016 **SLO Status:** Active	**Assessment Method:** The development, test and modification of a program that contains complex data structures. The student must be able to tell how her chosen data structure and algorithm works, and why she chose the design that she used in the project. **Assessment Method Type:** Class/Lab Project **Target:** 100% of the students earning this degree will pass this assessment.	06/18/2013 - These skills are tested in the courses CS 1B/1C or 2B/2C and the programs written by students completing those courses consistently demonstrate a high degree of skill in designing data structures and using them in a variety of complex algorithms. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	