DEPARTMENT OR PROGRAM: CIS Department

DIVISION: Business/Technology

I.   DESCRIPTION OF PROGRAM

The Computer Information Science Department offers 20-23 sections of 15-20 separate courses each semester, ranging from Intro to Computer Information Science through advanced programming and Internet Programming courses. All courses are certificate-applicable, Associate Degree-applicable, and/or university-transferable.

II.   STUDENT LEARNING OUTCOMES (SLOs)

a. Please list the courses, if any, for which SLOs have not been assessed. What assessment is planned for these courses? What assistance or resources would help to complete assessment?

CIS 121 UNIX/Linux
CIS 490 Computer Forensics: Network Analysis and Defense

CIS 121 is a new course combining CIS 312 and CIS 313 (both have been banked). The instructor will complete SLO assessments at the end of the spring 2012 semester. CIS 490 has been cancelled repeatedly, not allowing SLOs to be assessed. It will be offered again in fall 2012. If not cancelled, then SLOs will be assessed after fall 2012.

The college does not provide adequate training resources to part-time instructors for help with their student learning outcomes. Online instructors in particular need help with WebAccess to integrate SLOs and capture SLO assessment data.

b. Please list any degrees offered. Have SLOs been identified for each degree?
Briefly describe the department's plan for assessment.

Associate in Science Degrees
Computer and Information Science
Computer and Network Forensics
Computer Science Applications and Development
Computer Support Specialist: Network Support (banked 10/5/2011)

All degrees have SLOs. Student learning outcomes for the degrees are linked to successful completion of specific courses. The department will need to examine PRIE data for individual courses to determine if students have met degree-level student learning outcomes.

c. Please list any certificates offered. Have SLOs been identified for each certificate?
Briefly describe the department's plan for assessment.

Certificates of Achievement
Computer and Network Forensics
Computer Science Applications and Development
Computer Support Specialist: Network Support (banked 10/5/2011)

All Certificates of Achievement have SLOs. Student learning outcomes for these certificates are linked to successful completion of specific courses. The department will need to examine PRIE data for individual courses to determine if students have met all certificate-level student learning outcomes.

Certificates of Specialization
C++ Programming
CIS Network Security Specialist
Computer Forensics
Internet Programming
Java Programming

All Certificates of Specialization have SLOs. Student learning outcomes for the certificates of specialization are linked to successful completion of specific courses. The department will need to examine PRIE data for individual courses to determine if students have met certificate-level student learning outcomes.

d. Based on assessment results, 1) what changes will the department consider or implement to improve student learning; and 2) what, if any, resources will the department or program require to implement these changes? (Please itemize these resources in section VII of this document.)

Based upon assessment of PRIE data for success rates of individual courses linked to degree/certificate SLOs, the department could then address course-level SLOs, if necessary. After requesting funds for tutoring in the last three program reviews (2009-11), the department will finally have CIS tutors in the Learning Center beginning fall 2012. We expect this to help with overall success and retention, particularly in the introductory courses.

e. Below please update the program's SLO Alignment Grid below. The column headings identify the General Education (GE) SLOs. In the row headings (down the left-most column), input the course numbers (e.g. ENGL 100); add or remove rows as necessary. Then mark the corresponding boxes for each GE-SLO with which each course aligns.

If this *Program Review and Planning* report refers to a vocational program or a certificate program that aligns with alternative institutional-level SLOs, please replace the GE-SLOs with the appropriate corresponding SLOs.

GE-SLOs → Program Courses ↓	Effective Communication	Quantitative Skills	Critical Thinking	Social Awareness and Diversity	Ethical Responsibility
CIS 110	X	X	X	X	X
CIS 111	X	X	X		
CIS 113	X	X	X		
CIS 114	X	X	X		
CIS 121	X	X	X		
CIS 125	X	X	X		
CIS 151	X	X	X		
CIS 254	X	X	X		
CIS 255	X	X	X		

eCIS 256	X	X	X		
CIS 278	X	X	X		
CIS 279	X	X	X		
CIS 363	X	X	X	X	X
CIS 364	X	X	X	X	X
CIS 379	X	X	X		
CIS 380	X	X	X		
CIS 390	X	X	X		
CIS 479	X	X	X	X	
CIS 489	X	X	X	X	
CIS 490	X	X	X	X	X
CIS 491	X	X	X	X	X
CIS 492	X	X	X	X	X

III.   DATA EVALUATION

a. Referring to the Enrollment and WSCH data, evaluate the current data and projections. If applicable, what programmatic, course offering or scheduling changes do trends in these areas suggest? Will any major changes being implemented in the program (e.g. changes in prerequisites, to-be-arranged hours (TBA), lab components. etc.) require significant adjustments to the Enrollment and WSCH projections?

Between 2008-09 and 2010-11 CIS enrollment increased by 6%. At this rate the current 973 headcount should reach 1027 by 2013-14. These projections reflect an overall stable department and probably underestimate future growth. Two changes in the curriculum will likely lead to increased enrolment in the next three years. Firstly, the department continues to move courses to the distance mode which opens the courses to a broader audience. Secondly, a foundation class has recently been approved to meet the Information Literacy A.S. requirement. As a consequence it is expected the department will offer more sections starting fall 2012.

b. Referring to the Classroom Teaching FTEF data, evaluate the current data and projections. If applicable, how does the full-time and part-time FTEF affect program action steps and outcomes? What programmatic changes do trends in this area suggest?

Since 2008 the full-time FTEF has increased from 2.53 to 4.07 and adjunct FTEF has decreased from 1.69 to 0.83. This represents a 23% increase in the number of sections taught by full-time faculty which currently is at 80%. This shift is primarily due to the cancelation of most of the courses taught by adjunct. In 2010 a full time faculty returned to the department. Within a semester of this another full time faculty retired. Thus the number of full time faculty has essentially remained at three since 2005. At this time the department is not recommending any changes in this area.

c. Referring to the Productivity (LOAD) data, discuss and evaluate the program's productivity relative to its target number. If applicable, what programmatic changes or other measures will the department consider or implement in order to reach its

productivity target? If the productivity target needs to be adjusted, please provide a rationale.

LOAD increased from 486 to 524 since 2008-09.   Projections from PRIE put the department at a LOAD of 585 by 2013-14. The department's more optimistic projections could bring it closer to 600 (see a. above). The productivity target has not only been met but is soon to surpass expectations.

IV. STUDENT SUCCESS EVALUATION AND ANALYSIS

a. Considering the overall "Success" and "Retention" data, briefly discuss how effectively the program addresses students' needs relative to current, past, and projected program and college student success rates.

The average CIS success rate is 59.3% which is within 14% of the college average. The department's retention rate is 74.6% making it 11% from the college average. These lower rates may be attributed to a variety of reasons including but not limited to: (1) often there is a lack of basic math and/or reading skills for which little help is available. The department is hopeful that the new Student Learning Center will provide help in this area as well as provide direct tutoring for CIS content. (2) 55.25% of CIS students are over 30 years of age. This means students in CIS classes are often working, raising families, and possibly caring for aging parents in addition to attending school. (3) Two of the department's programs, Internet Programming and Forensics are offered exclusively online. While broadening the audience it also brings the extra burden of keeping students engaged and success from a distance. See more discussion on this below.

Average Over 3-years (2008/09 – 2010/11)		
	College Totals	CIS Department
Retention %	84.3%	74.6%
Success %	69.6%	59.3%

Discuss distance education (online and hybrid modes) success and retention data and, where possible, compare with data for on campus sections.

The average CIS success rate is 55.25% which is within 6% of the college average for distance education courses. The department's retention rate is 74.5% making it 3.7% from the college average. Smaller class sizes show higher success and retention rates. This could be for two reasons (1) lower enrolled classes are typically advanced sections with serious, motivated students and (2) faculty have more time to give individual attention to members of the class. All courses would benefit from a 30 student cap in enrollment. The negative effects of over enrolling online courses can be seen in the foundation courses where there is an inverse ratio of class size to success rate. The department's retention rates still stand favorably against a nationwide comparison in the field of computer science where 30-40% attrition is common, with some schools surpassing 60%.*

*A Better Approach to Introductory Computer Science for Majors, by Sloan and Troy ACM SIGCSE; Why the High Attrition Rate for Computer Science Students: Some Thoughts and Observations by Beaubouef and Mason, ACM SIGCSE)

Distance Education CIS courses averages 2009-2011

	Headcount	Success	Retention	Over 30 years of age
A. Foundation Classes	295	42%	73%	48%
B. Transfer Classes	175	49%	69%	42%
C. Internet Programming	203**	67%	76%	73%
D. Forensics	173**	63%	80%	64%
TOTALS Averages		55.25%	74.5%	56.75%

**This program is only offered in the distance mode.

If applicable, identify unmet student needs related to student success and describe programmatic changes or other measures the department will consider or implement in order to improve student success. (*Note that item IV b, below, specifically addresses equity, diversity, age, and gender.*)

For years the department has asked for funds to support a CIS tutoring program. This year with the opening of the new Student Learning Center, this may become a reality. CIS faculty are recruiting students to apply for the Center's tutoring positions and are optimistic this will improve student success and possibly retention.

b. Briefly discuss how effectively the program addresses students' needs specifically relative to equity, diversity, age, and gender. If applicable, identify unmet student needs and describe programmatic changes or other measures the department will consider or implement in order to improve student success with specific regard to equity, diversity, age, and gender.

The ethnicity of CIS students are roughly 40% White, 20% Asian, and the remaining 40% split between Black, Filipino, Latino, and Pacific Islander. Men out-number women over 2 to 1. Just over 55% of CIS students are over 30 years of age, which puts over half of CIS students in a non-traditional age bracket. The percent of over-30 students increases sharply in the online classes. These students are more likely to be working, raising families, and/or taking care of aging parents. Retaining non-traditional students requires additional flexibility and consideration to accommodate their schedules and needs.

V. REFLECTIVE ASSESSMENT OF INTERNAL AND EXTERNAL FACTORS AND PROGRAM/STUDENT

a. Using the matrix provided below and reflecting on the program relative to students' needs, briefly analyze the program's strengths and weaknesses and identify opportunities for and possible threats to the program (SWOT analysis). See page 10 for definition of SWOT). Consider both external and internal factors. For example, if applicable, you might consider changes in our community and beyond (demographic, educational, social, economic, workforce, and, perhaps, global trends); look at the demand for the program; program review links to other college and District programs and services offered; look at similar programs at other area colleges; and investigate auxiliary funding.

	INTERNAL FACTORS	EXTERNAL FACTORS
Strengths	The department has experienced instructors, who are well-versed in course material and seasoned teachers. Many courses are offered online for the convenience of students who cannot easily get to campus. Advanced, more specialized courses are often taught by industry professionals who can offer a 'real world' flavor to the material	The CIS department meets yearly with an Advisory Committee made up of industry specialists and past students in order to brainstorm for needed program change. This has the added benefit of making the department eligible for VTEA funding, which can be used for training and equipment to enhance the program offerings.
Weaknesses	Due to low enrollment, some courses must be cancelled, requiring students to find suitable replacements elsewhere. When students go to other campuses they often do not return. Due to low enrollment, some courses must be offered as cross-lists to make minimum enrollment numbers, placing an extra time burden on instructors. Additionally, the crossing of traditional/online sections does not always allow the instructor to best meet the needs of these two diverse audiences. Cancellation of required courses for the Computer and Network Forensics degree/certificate can force students to wait up to one additional year to complete their program.	Students are often underprepared in the Math/Reading areas, and take courses before they are ready. Non-traditional students may not have attended a college course in many years. It can be difficult for them to establish good study habits and structured learning.
Opportunities	Living in the Bay Area, provides the opportunity to hire faculty who are involved with leading-edge technology. Former students will often return when we offer a new course in more recent technology. Attention must be paid to computing trends to keep the program relevant. The department is planning to offer an online Certificate of Completion in Internet Programming, and hopes to eventually offer an online degree.	CSM's Marketing Division could capitalize on the increasing age of students and produce advertising materials better geared to the returning student. PRIE could develop specific student distribution lists to better target email invitations for students to consider a certain class. Hiring in the tech sector has rebounded dramatically in the Bay Area. There are many opportunities for students in web development.
Threats	The ever-changing nature of CIS requires constant retraining and rethinking of curricula. The college does not provide adequate or timely professional development for retraining. This leaves instructors often spending summer, spring and/or winter break learning new technologies or updating skills. Attrition reduces the number of students	Although students are still interested in CIS, the notable shift in the job market has dropped enrollment drastically over the last six years. Despite the fact that technology has significantly rebounded, not everyone is aware of this. Competition of neighboring community colleges providing similar curricula can sometimes drain from CSM's enrollment.

who go on to enroll in upper-level courses. This forces cross-linked courses to be offered in order to continue some course offerings. The instructor teaches two or three sections, lecture and online, but is only credited with teaching a single course. Computerized prerequisite checking has significantly reduced enrollment by 50-75% in many classes. The college provided no clear way for students to understand how to appeal when blocked from registering for a class. Instructors have to answer hundreds of emails from unhappy students locked out of classes that they are often over-qualified to take. Some students who have submitted petitions have complained that they never got a response to their petitions. This has driven many current and potential students to enroll in similar classes in neighboring districts. In addition, classes that previously had full wait lists were cancelled because a large number of qualified students were unable to enroll. Students are then unable to complete their programs in a timely manner.	The state budget crisis has resulted in a $149 million dollar mid-year shortfall in community college funding. CIS (as well as many other departments) will not be able to offer additional classes and is being held to a maximum of 20 sections for fall 2012.

b. If applicable, discuss how new positions, other resources, and equipment granted in previous years have contributed towards reaching program action steps and towards overall programmatic health. If new positions, equipment, or other resources have been requested but not granted, discuss how this has impacted overall programmatic health. (You might reflect on data from Core Program and Student Success Indicators for this section.)

The CIS department has not recently requested or received new positions, equipment, or other resources.

VI. Goals, Action Steps, and Outcomes

a. Identify the program's goals. Goals should be broad issues and concerns that incorporate some sort of measurable action and should connect to CSM's *Educational Master Plan, 2008 (EMP); Data Updates to EMP, 2011-12; College Index, 2008/9-2011/12; Institutional Priorities, 2008-2011; 5 & 5 College Strategies; GE-SLOs; SLOs.*)

Our previous goal of providing tutoring to CIS students will be met in fall 2012.

The CIS department has discontinued the Computer Support Specialist degree and Certificate of Completion due to many of the courses not being offered and a significant decline in the number of students in this program. This year we have expanded our Internet Programming curriculum by adding three new permanent courses and will move toward offering an online Certificate of Completion, with the hope of eventually offering an online Associate's degree.

b. Identify the action steps your program will undertake to meet the goals you have identified.

The department must petition the State Chancellor's Office for approval of an online Certificate of Completion in Internet Programming. We will need to identify sufficient General Education online course offerings in order to make an online Associate's degree possible. We would also have to seek approval from the State Chancellor's Office for an online degree.

In addition, the department must actively investigate possible funding opportunities for STEM education to help with curriculum development and training for instructors.

c. Briefly explain, specifically, how the program's goals and their actions steps relate to CSM's *Educational Master Plan, 2008 (EMP); Data Updates to EMP, 2011-12; College Index, 2008/9-2011/12; Institutional Priorities, 2008-2011; and 5 & 5 College Strategies.*

There is huge demand for web developers, particularly for programmers with mobile development skills. We must be sensitive to current trends in the technology sector and offer relevant courses that reflect these trends. We have updated our Internet Programming Certificate of Specialization every year for the past five years. With the addition of three new courses we now have sufficient curriculum to offer a Certificate of Completion in Internet Programming.

d. Identify and explain the program's outcomes, the measurable "mileposts" which will allow you to determine when the goals are reached.

A milepost would be approval of the Certificate of Completion in Internet Programming by the State Chancellor's office.

The department will examine the success and retention data for our classes to see if tutoring has had a beneficial result.

VII. SUMMARY OF RESOURCES NEEDED TO REACH PROGRAM ACTION STEPS

a. In the matrices below, itemize the resources needed to reach program action steps and describe the expected outcomes for program improvement.* Specifically, describe the potential outcomes of receiving these resources and the programmatic impact if the requested resources cannot be granted.

* *Note:* Whenever possible, requests should stem from assessment of SLOs and the resulting program changes or plans. Ideally, SLOs are assessed, the assessments lead to planning, and the resources requested link directly to those plans.

Full-Time Faculty Positions Requested	Expected Outcomes if Granted and Expected Impact if Not Granted	If applicable, briefly indicate how the requested resources will link to achieving department action steps based on SLO assessment.
None	---	---

Classified Positions Requested	Expected Outcomes if Granted and Expected Impact if Not Granted	If applicable, briefly indicate how the requested resources will link to achieving department action steps based on SLO assessment.
None	---	---

b. For instructional resources including equipment and materials, please list the exact items you want to acquire and the total costs, including tax, shipping, and handling. Include items used for instruction (such as computers, furniture for labs and centers) and all materials designed for use by students and instructors as a learning resource (such as lab equipment, books, CDs, technology-based materials, educational software, tests, non-printed materials). Add rows to the tables as necessary. If you have questions as to the specificity required, please consult with your division dean. Please list by priority.

Resources Requested	Expected Outcomes if Granted and Expected Impact if Not Granted	If applicable, briefly indicate how the requested resources will link to achieving department action steps based on SLO assessment.
None		

Status = New, Upgrade, Replacement, Maintenance or Repair.

VIII. Course Outlines

a. By course number (e.g. CHEM 210), please list all department or program courses included in the most recent college catalog, the date of the current Course Outline for each course, and the due date of each course's next update.

Course Number	Last Update Date	Six-year Update Due Date
CIS 110	Oct-11	Oct-17
CIS 111	Feb-11	Feb-17
CIS 113	Jan-12	Jan-18
CIS 114	Jan-12	Jan-18
CIS 121	Jan-12	Jan-18
CIS 125	Oct-11	Oct-17
CIS 151	Dec-08	Dec-14
CIS 254	Dec-07	Dec-13
CIS 255	Dec-09	Dec-15
CIS 256	Dec-05	Requires immediate attention
CIS 278	May-10	May-16
CIS 279	Dec-05	Requires immediate attention

CIS 363	Jan-12	Jan-18
CIS 364	Dec-08	Dec-14
CIS 379	Jan-12	Jan-18
CIS 380	Jan-12	Jan-18
CIS 390	banked	
CIS 479	Jan-07	Jan-13
CIS 489	Jan-07	Jan-13
CIS 490	Jan-07	Jan-13
CIS 491	May-07	May-13
CIS 492	banked	

IX. Advisory and Consultation Team (ACT)

a. Please list non-program faculty who have participated on the program's Advisory and Consultation Team. Their charge is to review the *Program Review and Planning* report before its submission and to provide a brief written report with comments, commendations, and suggestions to the Program Review team. Provided that they come from outside the program's department, ACT members may be solicited from faculty at CSM, our two sister colleges, other community colleges, colleges or universities, and professionals in relevant fields. The ACT report should be attached to this document upon submission.

Professor Robert Hasson, Department of Mathematics, CSM
Professor David Robinson, Department of Mathematics, CSM

Report on the Computer and Information Sciences Department Program Review for 2012

Professor Robert Hasson
Department of Mathematics
College of San Mateo

Advisory and Consultation Team

CIS courses

-- Require adequate skills in mathematics and reading
-- Require much intensive analytical and critical thinking
-- Are time consuming due to the necessary repeated cycle of design, test, find bugs, and debug in any computer program

Because of the above demands of most CIS courses, CIS students can benefit from tutoring support. So it is an accomplishment and a milestone that such tutoring support will now be available at the Learning Center.

Also because of the above demands, it may be challenging to attain student success rates as high as in non-technical disciplines. Students often have other challenging courses, and work up to and beyond full-time and may simply lack the time needed. The CIS Department has done well to keep success rates above national rates.

The CIS Department needs support from administration with the problem of the deleterious effects of computerized prerequisite checking. It is most unfortunate that potential students are turned away because they lack local prerequisites but they have equivalent outside coursework, training, or experience. (This is very common in the world of computer science.) It appears that the prerequisite challenge process is not adequately and in a timely way addressing the resulting prerequisite challenges.

Suggestion: Let CIS faculty or STEM faculty in the Math/Science Division assist with the screening of the prerequisite challenges. This is how the many prerequisite challenges in math courses are often handled.

I agree with Bob Hasson's remarks.

David Robinson

b.   Briefly describe the program's response to and intended incorporation of the ACT report recommendations.

The CIS department has been proactive in responding to computerized prerequisite checking. A survey of similar or identical Internet Programming courses in four neighboring districts showed only advisories and no prerequisites. Prerequisites for Internet Programming courses were thus removed, as they were found to be in direct violation of state Title 5 regulations. The majority of students successfully completing these courses had not taken the prerequisite course. However, prerequisites do (and should) remain in place for transfer-track courses.

CIS faculty has been occasionally consulted regarding prerequisite challenges. However, it remains that some students have never received any response to their petitions.

The CIS department is very pleased to be able to offer tutoring to students beginning fall 2012.

X.   PROGRAM REVIEW PARTICIPANTS AND SIGNATURES

Date of Program Review evaluation:

Please list the department's *Program Review and Planning* report team:

Primary program contact person: Melissa Green
Phone and email address: 650) 574-6374 greenm@smccd.edu
Full-time faculty: Stacey Grasso, Martha Tilmann
Part-time faculty: Ronald Brown, Stan Isaacs, Bryce Martens, Douglas Putnam, Robert Timlin
Administrators: Kathy Ross
Classified staff: Cory Putnam

Primary Program Contact Person's Signature	*Date*
Full-time Faculty's Signature	*Date*
Part-time Faculty's Signature	*Date*
Classified Staff Person's Signature	*Date*
Dean's Signature	*Date*