PROGRAM REVIEW AND PLANNING
Approved 9/2/08 Governing Council

The Program Review process should serve as a mechanism for the assessment of performance that recognizes and acknowledges good performance and academic excellence, improves the quality of instruction and services, updates programs and services, and fosters self-renewal and self-study. Further, it should provide for the identification of weak performance and assist programs in achieving needed improvement. Finally, program review should be seen as a component of campus planning that will not only lead to better utilization of existing resources, but also lead to increased quality of instruction and service. A major function of program review should be to monitor and pursue the congruence between the goals and priorities of the college and the actual practices in the program or service.

~Academic Senate for California Community Colleges

Department or Program:
Division:

I. **DESCRIPTION OF PROGRAM** *(Data resources: "Number of Sections" data from Core Program and Student Success Indicators; CSM Course Catalog; department records)*

> The Computer Information Science Department offers 22 separate courses and 19 sections for Spring 2009, ranging from Intro to Computer Information Science through advanced programming courses and internet programming courses. All courses are Certificate-applicable, Associate Degree-applicable, and University Transferable.

II. **STUDENT LEARNING OUTCOMES** *(Data resources: SLO records maintained by the department; CSM SLO Coordinator; SLO Website)*

> a. Briefly describe the department's assessment of Student Learning Outcomes. Which courses or programs were assessed? How were they assessed? What are the findings of the assessments?

	Course	Title	1st Assessment Cycle	Number of course-level content SLOs	Number of course-level SLOs assessed as of March 09	Number of course-level SLOs projected for assessment by June 09	Instrument	Completion Status March 09	2nd Assessment Cycle
1	110	Intro to Computer and Info Science	2008-2009	9	9	9	Exam questions, labs, term paper	yes	2009-2010
2	111	Intro to Internet Programming	Fall 2008	7	7	7	Lab assignments, exam questions	yes	2009-2010
3	125	Visual Basic I	Summer 2008	9	7	7	Lab assignments, exam questions	partial	Summer 2010
4	151	Networks and Digital Com-munication	2008-2009	8	8	8	Exam questions, term paper	yes	2009-2010
5	254	Intro to Object-Oriented Program Design	2008-2009	10	10	10	Test/exam questions, lab, programming assignment	yes	2009-2010
6	255	Programming Methods: Java	2008-2009	8	8	8	Test/exam questions, lab, or programming assignment	yes	2009-2010
7	256	Data Structures: Java	2007-2008	8	4	4	Exam question, programming project	partial	2009-2010
8	278	Programming Methods: C++	2007-2008	8	5	5	Exam question, programming project	partial	2009-2010
9	279	Data Structures: C++	2007-2008	8	4	4	Exam question, programming project	partial	2009-2010
10	312	UNIX Operating Systems I	Spring 2009	5	5	5		yes	2009-2010
11	313	UNIX Operating Systems II	Spring 2009	7	0	0		no	Course will be combined with UNIX I in fall 2009
12	362	Enterprise Database Management	Taught as 360/361 in spring 2007	8	0	0	Exam questions, labs	no	Will be replaced by MySQL course
13	377	Internet Programming: JavaScript/ HTML	2008-2009	9	9	9	Exam questions, programming assignments	yes	2009-2010
14	379	Internet Programming: XML	Summer 2008	9	8	8	Exam questions, programming assignments	partial	Summer 2009

15	380	Internet Programming: PHP	Fall 2008	9	9	9	Exam questions, programming assignments	yes	Fall 2009
16	390	Internet Programming: Perl	Fall 2008	8	7	7	Exam questions, programming assignments	partial	Fall 2009
17	479	Network Security Fundamentals	Fall 2008	8	0	0	Exam question, term paper	no	Fall 2009
18	488	Firewalls and Network Security	Course cancelled Fall 2008	7	0	0	Exam question, lab	no	Spring 2010
19	489	Computer Forensics	2008-2009	11	11	11	Exam question, term paper	yes	2009-2010
20	490	Computer Forensics: Network Defense and Analysis	Course cancelled Spring 2009	10	0	0	Final exam and projects	no	Course will be offered online in spring 2010
21	491	Computer Forensics: Search and Seizure	2008-2009	5	4	4	Final exam and projects	partial	Fall 2009
22	492	Computer Forensics: White-Collar Crime	Course cancelled Fall 2008	7	0	0	Final exam questions	no	Course will be offered online in spring 2010
		Totals		**178**	**115**	**115**			

Findings of Assessment:
Cycle 1

CIS 110

- *Observation:* Students are non-major and take this course as an elective. Students tend to do well in the course and the majority of students meet all learning outcomes when successfully completing the course.

CIS 111

- *Observation:* This course was created for Multimedia and other non-CIS majors to learn basic internet programming. These students found CIS 254 very challenging and needed a prerequisite course for other internet programming courses. Students completing the course achieve the learning outcomes and are adequately prepared to take more advanced internet programming courses.
- *Action:* Modify prerequisite for internet programming courses to allow CIS 111 or CIS 254.

CIS 125

- *Observation:* This Visual Basic programming course was offered online in summer 2008 and, for the first time in many years, had sufficient enrollment. Previous lecture classes were extremely low-enrolled and were sometimes cancelled. Students completing the course achieved the learning outcomes that were assessed. Because we offer introductory Java programming every semester students have an option to learn basic programming. There is less demand for this course.
- *Action:* Because the class does not fill in fall or spring semesters we will offer it again online in summer 2010.

CIS 151

- *Observation:* This networking course was created to combine material from CIS 150 and 152. There were often not enough students for CIS 152 to run. CIS 151 now replaces CIS 150 and 152. The class has sufficient enrollment. It is part of the Computer and Network Forensics program as well as the Computer Science Applications and Development major and the Computer Support Specialist major. Students completing the course achieve the learning outcomes and are adequately prepared to take more advanced networking courses.

CIS 254

- *Observation:* This is the introductory programming course for the transfer track. Students often have weak math skills, which is a predictor for non-success. The CIS department has no drop-in lab, unlike the Math and English departments. Students need access to tutors and the college does not provide adequate tutoring services, unlike other campuses within and outside of the district. Classes have high attrition, due at least in part to the lack of support services for students. Introduction of robot programming has helped lower attrition. The majority of students successfully completing the course have achieved the learning outcomes. Students with strong math skills do best in this course.
- *Action:* Faculty will:
  - Continue using Lego robots to reinforce programming concepts.
  - Request funds for CIS tutors so that we can provide drop-in and scheduled tutoring services.

CIS 255

- *Observation:* Course accommodates CIS majors and students needing to learn Java to expand their knowledge of programming. Many students are employed and find the workload in CIS 255 very time-consuming. Attrition is often due to lack of time to complete assignments rather than inability to do so. Students with the CIS 254 prerequisite generally succeed in the course, while those who have an equivalent prerequisite often lack basic concepts covered in CIS 254. Until recently this course has been taught with combined online and lecture sections, which is a poor approach because these sections have entirely different needs. Lecture students have a higher success rate than online students. Lecture students have complained that meeting twice a week for six hours is too time-consuming and have suggested meeting once a week for a three-hour lecture.
- *Action:* Instructor teaching the course took steps to address the observations noted, including:
  - Course is currently taught as a hybrid course with once a week in-person lecture and online lab. Instructor maintains a drop-in lab for students needing hands-on help. Weekly labs are assigned to keep students on track.
  - Course will be taught online with published lecture and some in-person meetings in fall 2009.

CIS 256

- *Observation:* This course is the last course in our transfer track, and is populated by students preparing for entry to a 4 year school, and also by professionals wishing to hone advanced Java programming skills. Two cycles of assessment have been completed with most SLO's. The most recent assessment indicated that although a majority of student achieve expected outcomes, a number still have difficulty implementing complex algorithms necessary for abstract data type construction.
- *Action*: Provide more lab exercises/practice problems for students, in addition to the regular programming projects, to hone programming skills in difficult areas.

CIS 278

- *Observation:* This course has completed two cycles of assessment of most SLO's. It continues to be evident that students still do not have a firm grasp on the areas of inheritance and polymorphic behavior. Although this material was introduced earlier in the course as a result of assessment cycle 1, clearly it was not early enough.
- *Action*: The course will be reworked to accelerate simpler 'review' type topics, and move into advanced object oriented material by mid term.

CIS 279

- *Observation:* This course is the last course in our transfer track, and is populated by students preparing for entry to a 4 year school, and also by professionals wishing to hone advanced Java programming skills. Two cycles of assessment have been completed. The most recent assessment indicated that although a majority of student achieve expected outcomes, a number still have difficulty implementing complex algorithms necessary for abstract data type construction.
- *Action*: Provide more lab exercises/practice problems for students, in addition to the regular programming projects, to hone programming skills in difficult areas.

CIS 312-313

- *Observation:* These short-term one unit classes are UNIX I and II. UNIX II is only taught once a year to accommodate students from fall and spring semesters. There is additional material that should be covered in these classes.
- *Action: Instructor decided to:*
  - combine the two UNIX courses into one new three unit full-semester experimental course beginning in fall 2009. This course will be offered in the fall and spring semesters.

CIS 362

- *Observation:* This course, Enterprise Database Management, uses Oracle. We offer a similar course using MySQL that is currently an experimental course and will become a permanent course in fall 2009. We are expanding our database offerings with a new course in Data Warehousing to be offered in fall 2009. Enrollment in database courses has increased in the past two years.

CIS 377

- *Observation:* This short-term 8 week online course has a high attrition rate. Students often wait three or more weeks to purchase the textbook, which does not allow them to succeed in the course. Although the book is available on reserve in the college library, many students do not live in the district. Students completing the course successfully meet all student learning outcomes.
- *Action: Instructor decided to:*
  - combine the JavaScript course with the short-term experimental Ajax course so that the new course will run a full semester and cover more material. This will not happen until fall 2010.
  - choose a textbook that is available online in Safari so that students will have access to the textbook while waiting for their textbook to be delivered. This will be done in fall 2009.

CIS 379

- *Observation:* Course is taught once a year in the summer semester. It is a requirement for the certificate in internet programming. A student who must drop the course must wait an entire year to retake this course. Enrollment is high in the summer semester but in the past the class has not filled in fall or spring semesters. It is difficult to cover all the material in the compressed summer session. Students successfully completing the course meet the student learning outcomes.

CIS 380

- *Observation:* Attrition is more often due to lack of time to complete assignments rather than inability to do so. It is more likely that an A or B student will drop rather than a low-performing student. The textbook is available online in Safari so that students can complete readings and assignments without having the textbook. Students completing the course successfully meet all student learning outcomes and are prepared for entry-level web development positions.

CIS 390

- *Observation:* This course is part of the internet programming certificate and is currently the only course in the program not offered completely online. Students completing the course successfully meet the student learning outcomes that have been assessed.
- *Action:* This course will be offered completely online in fall 2009 so that students who do not live in the district can attain their certificate in internet programming. Attrition will likely increase when it becomes an online course.

CIS 479

- *Observation:* Enrollment has been low. It is a required course in the Computer and Network Forensics curriculum. Student learning outcomes have not yet been assessed.
- *Action:* Course will be offered online beginning fall 2009 so that students who do not live in the district can take the course. Also, students with changing work schedules could take an online course..

CIS 488

- *Observation:* Course has not been offered for some time due to cancellation for low enrollment. This course is a requirement in the Computer and Network Forensics program. Software used in this course is currently available to students so that they are not obliged to complete coursework in person. The SLOs have not yet been assessed.
- *Action:* This course will be offered completely online in spring 2010 so that students who do not live in the district can take the course. Also, students with changing work schedules could take an online course.

CIS 489

- *Observation:* This introductory Computer Forensics course has been low-enrolled for several years. There has been one section offered each fall and spring semester. Students completing the course successfully meet all student learning outcomes. The target audience for this course is law enforcement. However, work schedules of law enforcement personnel often change several times during a semester, making it impossible to complete the course because of the work conflict. Software used in this course is currently available to students so they are not obliged to complete coursework in person.
- *Action:*
    - Course will be taught in lecture mode in summer 2009 to attract more students to the Computer and Network Forensics program. Summer enrollments are often higher than fall and spring semesters, and this should help with future enrollment in the more advanced courses in the series (CIS 490 and 491).
    - Course will be offered online in fall 2009 to attract students from outside the district, as well as students with time conflicts.

CIS 490

- *Observation:* Course was cancelled in spring 2009 due to low enrollment. Course will be taught online when it is next offered in spring 2010. The target audience for this course is law enforcement. However, work schedules of law enforcement personnel often change several times during a semester, making it impossible to complete the course because of the work conflict. Software used in this course is currently available to students so they are not obliged to complete coursework in person. The SLOs have not yet been assessed.
- *Action:* This course will be offered completely online in fall 2009 so that students who do not live in the district can take the course. Also, students with changing work schedules could take an online course.

CIS 491

- *Observation*: Students successfully completing this course meet learning outcomes and are prepared to work as entry-level computer forensic technicians. Enrollment is low. The target audience for this course is law enforcement. However, work schedules of law enforcement personnel often change several times during a semester, making it impossible to complete the course because of the work conflict. Software used in this course is currently available to students so they are not obliged to complete coursework in person.
- *Action:* This course will be offered completely online in fall 2009 to allow students who do not live in the district to take the course. Also, students with changing work schedules could take an online course.

CIS 492

- *Observation:* Course was last taught in fall 2007. Since then it has been cancelled due to low enrollment. The target audience for this course is law enforcement. However, work schedules of

law enforcement personnel often change several times during a semester, making it impossible to complete the course because of the work conflict. Software used in this course is currently available to students so they are not obliged to complete coursework in person. This course is an elective in the Computer and Network Forensics program. The SLOs have not yet been assessed.

- *Action:* This course will be offered completely online in spring 2010 so that students who do not live in the district can take the course. Also, students with changing work schedules could take an online course.

III. **DATA EVALUATION** *(Data resources: Core Program and Student Success Indicators from the Office of Planning, Research, and Institutional Effectiveness)*

        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, hours by arrangement, lab components) require significant adjustments to the Enrollment and WSCH projections?

The field of internet programming changes rapidly and we must create many new experimental courses to reflect these changes. We currently offer experimental courses in MySQL, Ajax, and Ruby. These courses will become permanent courses in fall 2009. Offering new experimental courses has helped to increase enrollment. We will also offer a new database course in Data Warehousing in fall 2009. Our department must constantly update our course offerings to reflect trends in the market. We will update the internet programming certificate in fall 2009 to incorporate the new permanent courses. Enrollment in online internet programming courses has been high, but with higher attrition than lecture courses. We cannot predict that enrollment will increase in the future due to the dramatic economic downturn.

The transfer-track courses do not change from year to year. We currently have few CIS majors, but many engineering students take programming classes, which has helped enrollment. The current economic climate might result in higher enrollment initially as unemployed people often try to update their skills to become more marketable. This happened previously in 2002. But if the economy does not recover enrollment might drop dramatically as it did during the tech bust. Thus we cannot assume that enrollment projections are accurate because our department is highly susceptible to marketplace trends.

Combining the two short UNIX courses into a single full-semester UNIX/Linux course should help increase enrollment in UNIX.

The Computer and Network Forensics degree and certificate program has been under-enrolled for several years. We will move some of the core courses online beginning in fall 2009 and plan to eventually add a Forensic Accounting course from the Business department to the degree and certificate program. Because of aggressive cancellation of low-enrolled courses it has been difficult for students to earn their degree or certificate.   The expectation is that by offering online courses we can attract more students from outside the district as well as make the courses more attractive to working students, especially those from law enforcement. Many other colleges have thriving online forensics programs.

Most of our courses are offered in the evening. Students taking our evening lecture courses must live within driving distance.   CSM has poor public transportation to/from campus in the evening, making it extremely difficult for non-drivers to attend evening courses. Offering online courses has always increased enrollment because students from outside the district can register for our courses. The population of our district is declining so we must look elsewhere to increase our enrollments. Offering online courses that are available 24-7 means that students from anywhere in the world can enroll. We have had online students from other states as well as every continent. But even students who live within our district can have difficulty scheduling a class for a specific evening.   If we can only offer a single section of a course the best option to fill it would be to offer it online.

b. Briefly evaluate the department's assessment of Student Learning Outcomes. If applicable, based on past SLO assessments, 1) what changes will the department consider or implement in future assessment cycles; 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.)

Most course-level SLOs have been assessed. Some courses are only offered once a year, making it more difficult to implement changes from SLO assessment findings from the previous year, particularly if that course is taught by a different instructor. Because the majority of our courses have only a single section, the assessment findings can more easily be used to improve the course if the same instructor teaches it. Instructors often modify a course as they are teaching it when discovering that students have a hard time with particular topics, and will spend more lecture and/or lab time to address difficulties.

Only CIS 110 and CIS 254 have multiple sections. Each course uses the same textbook for all sections to ensure that students will have similar learning outcomes. However, day classes and evening classes often have different populations, with evening classes having a higher proportion of students working fulltime. Evening students are often very highly-motivated, but can struggle with work and/or family commitments. Day students are more likely to be younger with less-developed study habits. Thus learning outcomes can be different for different sections of the same course. There can be attrition in different sections for very different reasons.

The transfer program is in need of tutoring services, especially for students in the introductory programming class CIS 254. Students have remarked that when they struggle with Math or English assignments they can readily get help in Math or English labs, but CIS does not have drop-in tutoring services available in the computer lab. In addition, the college does not provide individual tutoring services. We need to request funding to hire students to provide drop-in and individual tutoring services. We believe that students will stay in courses if they can get the help that they need in a timely manner.

All Computer and Network Forensics courses will be moved online beginning in fall 2009 in an effort to keep the program viable. SLO assessments will be helpful in design of online curricula, as problematic areas could be compensated for with the development of additional handouts, assignments/labs, and other supplementary material.

c. Below please update the program's SLO Alignment Grid. The column headings identify the 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. The definitions of the GE-SLOs can be found on the CSM SLOAC website: http://www.smccd.net/accounts/csmsloac/sl_sloac.htm (click on the "Institutional" link under the "Student Learning Outcomes" heading.) 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
CIS110	X	X	X	X	X
CIS111	X	X	X		
CIS125	X	X	X		
CIS151	X	X	X		
CIS254	X	X	X		
CIS255	X	X	X		
CIS256	X	X	X		
CIS278	X	X	X		
CIS279	X	X	X		
CIS312	X	X	X		

CIS313	X	X	X		
CIS362	X	X	X		
CIS377		X	X		
CIS379		X	X		
CIS380		X	X		
CIS390	X	X	X		
CIS479	X	X	X	X	
CIS488		X	X		
CIS489	X	X	X	X	
CIS490	X	X	X	X	X
CIS491	X	X	X	X	X
CIS492	X	X	X	X	X

IV. **DATA EVALUATION** *(Data resources: Core Program and Student Success Indicators from the Office of Planning, Research, and Institutional Effectiveness)*

   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, hours by arrangement, lab components) require significant adjustments to the Enrollment and WSCH projections?

CIS WSCH numbers reflect an overall stable head count from Fall 2005 – Spring 2008, and project the same through 2011. Typically transfer track classes fill, as do courses our Internet programming course offerings. Enrollment improvement is warranted in the Computer Forensic/Network Security area, and steps have been made to begin online offering of these courses in order to make them available to more students.

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

FTEF in the CIS department has declined over the past year, as a result of full time faculty retirement and a reduction in the number of sections offered by adjunct faculty. Still, the FTEF remains consistently above the college average FTEF.

   c. Referring to the Productivity 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. (Productivity is WSCH divided by FTE. The College's general target productivity will be recommended by the Budget Planning Committee.)

Productivity in CIS has increased over the past 3 years (2005-6: 359; 2006-7: 401; 2007-8: 438) and the projected increase surpasses the college average load in 2009-10. Although instructors are in contact with more students/week, it is important to note that Success and Retention rates have not altered significantly.

V. **STUDENT SUCCESS EVALUATION AND ANALYSIS** *(Data resources: Educational Master Plan; "Success Rates," "Dimension" data from Core Program and Student Success Indicators; previous Program Review and Planning reports; other department records)*

   a. Considering the overall "Success" and "Retention" data from the Dimension section of Core Program and Student Success Indicators, briefly discuss how effectively the program addresses students' needs

relative to current, past, and projected program and college student success rates. 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.*)

> The Retention rate for CIS has not varied significantly over the last 3 years (2005-6 78%, 2006-7 79%, 2007-8 75%) and is fairly low for a discipline that reports 30-40% attrition, with some schools surpassing 60% (CS 0.5: 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). CIS retention, however, is slightly lower than the college retention rate of 85%. This is attributed to a variety of reasons: lack of basic math and/or reading skills, an economy where students must often work while going to school, and a high percentage of online courses (online education is recognized to have high attrition).
>
> Additionally, CIS faculty feel that the absence of tutoring for students enrolled in programming courses is often the cause for student discouragement. While tutoring for programming students is available at the other two colleges in the District, CSM does not offer this service to its students.
>
> Student success in CIS (63%) is slightly lower than the college average (70%) and can be attributed to the same factors. Accordingly, CIS faculty members feel that a tutoring center would greatly increase student success rates.

    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.

> Numbers do not vary significantly with any of the groups profiled. Although, traditionally there are 1/3 as many women as men enrolled in CIS courses, the performance of women who are enrolled does not vary greatly from that of men. Nationally there is a trend of women having historically higher attrition rates than men in Computer Science.
>
> It should be noted that students age 50 and above have the highest success rate of any age group.

VI. REFLECTIVE ASSESSMENT OF INTERNAL AND EXTERNAL FACTORS AND PROGRAM/STUDENT SUCCESS *(Data Resources: Educational Master Plan; "Dimension: Retention and Success" data from Core Program and Student Success Indicators; previous Program Review and Planning reports; department records)*

    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). Consider both external and internal factors. For example, if applicable, consider changes in our community and beyond (demographic, educational, social, economic, workforce, and, perhaps, global trends); look at the demand for the program; review program links to other campus and District programs and services; 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. Many courses are offered in the evening and online for students who cannot attend daytime lecture.	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

	Advanced, more specialized courses are often taught by industry professionals who can offer a 'real world' flavor to the material	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. Student tutoring is not available in CIS, although students often inquire.	Students are often underprepared in the Math/Reading areas, and take courses before they are ready.
Opportunities	Living in the Bay Area, we have 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. We must pay attention to computing trends to keep our program relevant.	We could introduce more students to the department by offering intro classes at the local high schools. Concurrent enrollment is available in other departments.
Threats	The ever-changing nature of CIS requires constant retraining and rethinking of curricula, causing instructor burn out. The college does not always provide adequate professional development for retraining. Trends in computing do not always follow the deadline for long-term professional development applications, which comes early in fall and spring semesters. If the deadline is missed by even one day the instructor must wait an entire year to get release time. Instructors often spend summer, spring and/or winter break learning new technologies or updating skills. Attrition reduces the number of students 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.	Although students are still interested in CIS, the notable shift in the job market has dropped enrollment drastically over the last six years.

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 (you might also reflect on data from Core Program and Student Success Indicators). If new positions

have been requested but not granted, discuss how this has impacted overall programmatic health (you might also reflect on data from Core Program and Student Success Indicators).

Robots have helped improve retention in our introductory programming course. Students seem to be more engaged in lab assignments and are more willing to go beyond the requirements of an assignment to learn additional programming skills. In addition, students are more motivated to read API documents for the lejos Java programming language in order to complete their robot programs. Attrition is still an issue, however, and could be reduced by the availability of organized tutoring.

The department web server has allowed expansion of the internet programming curriculum, although administration of the server by ITS has not always been consistent.

Hardware and software purchased and/or donated to the Computer and Network Forensics program has afforded students hands-on access to the latest technologies in forensics. Students successfully completing the program are prepared for entry-level employment as a computer forensics technician, or for transfer to a four-year institution.

VII. **Action Steps and Outcomes** *(Data resources: Educational Master Plan, GE- or Certificate SLOs; course SLOs; department records; Core Program and Student Success Indicators; previous Program Review and Planning reports; Division work plan)*

    a. Identify the program's action steps. Action steps should be broad issues and concerns that incorporate <u>some sort of measurable action</u> and should connect to the Educational Master Plan, the Division work plan, and GE- or certificate SLOs.

- We want to offer tutoring in computer programming to our students. We should provide drop-in tutoring services for students, as do the Math, English and Reading departments. We should also make individual tutoring available.

    b. Briefly explain, specifically, how the program's action steps relate to the Educational Master Plan.

According to the Educational Master Plan, San Mateo county is projected to have an increase in demand for computer science majors. In order to reduce attrition, and help more of our students succeed in this area and move on to transfer and employment, additional support is needed.

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

Program retention rates, measured annually, will allow us to determine the success of a tutoring center, as will SLO measurements in our courses.

VIII. **SUMMARY OF RESOURCES NEEDED TO REACH PROGRAM ACTION STEPS** *(Data resources: Educational Master Plan, GE-SLOs, SLOs; department records; Core Program and Student Success Indicators; previous Program Review and Planning reports)*

    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.
See Resources Requested*		

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 <u>instruction</u> (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.
Funding for drop-in and scheduled tutoring services Student Assistant Salary Level D (Technical) Payrate: 13.25 – 14.25/hr A minimum of 15 hours /week would be scheduled. The overflow area of the CIS Computer lab would be sufficient area for the Tutoring Center, so no additional facility is requested.	Higher retention in transfer-track programming courses. If we cannot offer tutoring services then we will continue to experience current attrition and non-success rates.	We could increase the number of students successfully attaining all expected learning outcomes, especially in the introductory CIS 254 class. Even if students have poor math skills, a tutor could work with students in their problem areas. Tutoring has traditionally played a significant role in increasing student success.

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

IX. **Course Outlines** *(Data Resources: department records; Committee On Instruction website; Office of the Vice President of Instruction; Division Dean)*

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 Updated	Six-year Update Due

CIS110	4/2004	4/2010
CIS111	1/2007	1/2013
CIS125	2/2008	2/2014
CIS151	1/2007	1/2013
CIS254	12/2007	12/2013
CIS255	3/2003	3/2009
CIS256	12/2005	12/2011
CIS278	3/2003	3/2009
CIS279	12/2005	12/2011
CIS362	4/2007	4/2011
CIS312	3/2002	3/2008
CIS313	3/2002	3/2008
CIS377	12/2004	12/2010
CIS379	11/14/02	11/2008
CIS380	4/2007	12/2009
CIS479	1/2007	1/2013
CIS390	12/2004	12/2010
CIS488	11/2003	11/2009
CIS489	1/2007	1/2013
CIS490	1/2007	1/2013
CIS491	3/2007	3/2013
CIS492	1/2007	1/2013

X. 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, Math Department, CSM
Professor David Robinson, Math/Meteorology Departments, CSM

Robert Hasson:
CIS enrollments are closely tied to job market forces that affect the availability of IT jobs and careers.

Success in courses for CIS majors is heavily affected by student capabilities and experiences in mathematical skills and logical thinking.

In the face of negative changes in the job market and the large number of students weak in mathematics and critical thinking, the CIS Department has done a fine job in maintaining a viable program.

I note that CIS is making steady progress in SLOs across the CIS course offerings.

CIS faculty bring up the need for tutorial services to support their students. I believe such service would be helpful.

Attrition is high in CIS and always has been, apparently because of weak logical skills (predicted by weak math skills), the need for deep critical thinking in every idea of the field, and the time consuming nature of programming practice. Maturity of the student therefore has more impact on student success than in many other disciplines.

David Robinson:
I agree with Bob Hasson's observations.

It looks as though many of your classes are generating "hour by arrangement" money. Would that income be available to fund CIS tutorial services?

An explanation of why an online version of each class is appropriate would be helpful. If an online version is appropriate, what resources are needed to develop such a section?

As noted in the "Data Evaluation" and "Reflective Assessment of Internal and External Factors Program/Student Success" sections, CIS must keep up with a rapidly evolving field. The CIS faculty deserves commendation for doing so, and they deserve support for the effort required. Does CIS need more support than they can garner from their share of the limited Trustee's Program Improvement Grants?

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

Currently the hour by arrangement is satisfied in most courses by online website activities and interaction. Unfortunately, hour by arrangement dollars can only be used for events which are supervised by faculty with minimum qualifications in the subject matter. We would expect that our tutors would be students who are currently in the CIS program and have successfully completed core courses. Although it is not clear where funding will come from for this resource, we feel that it is an essential addition to the program.

Our Computer and Network Forensics program has regularly been under enrolled, and we cannot continue to offer low-enrolled courses in the current economic climate. In order to open the program to students out of our local area, and to keep the program viable, moving it online is our best alternative. Instructors are all in favor of this, and course materials (especially software) are readily available to students. Some instructors will need training in WebAccess to set up class web sites and develop instructional material. The college does offer workshops in WebAccess, as well as one-on-one training at the Center for Teaching and Learning (CTL). Our Internet Programming courses are currently all offered online, and have been thriving for the last few years, and the online sections of our Transfer track courses have allowed many students who cannot attend our traditional sections to enroll. This strongly suggests that the Computer and Network Forensics program might also benefit by being moved online.

In the past, faculty have received Professional Development funds to train for new courses and programs in general. In the past few years, no CIS request for professional development has been denied although faculty have been advised to make minimal requests for release time when funds were low.

Also, we have received two Trustees' Program Improvement grants to purchase hardware and software for the Computer and Network Forensics program and we received a Trustees' grant to purchase robots for the introductory Java programming course. Additional robots were purchased with departmental funds because the second Trustees' grant we submitted was not funded. The department also receives VTEA funds for the purchase of hardware and software.

Upon its completion, please email this Program Review and Planning report to the Vice President of Instruction, the appropriate division dean, and the CSM Academic Senate President.

Date of evaluation: March 24, 2009

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

Primary program contact person:
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grassos@smccd.edu/greenm@smccd.edu

Full-time faculty: Ron Brown, Stacey Grasso, Melissa Green
Part-time faculty: Stan Isaacs, Robert Timlin
Administrators:
Classified staff:
Students:

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Faculty's signatures   *Date*

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Dean's signature   *Date*