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## Instructional Program Review

Program Name: **Computer Information Science**

Program Contact: **Tilmann, Martha J.**

Academic Year: **2013-2014**

Status: **Submitted**

### 1. Description of Program

Provide a brief description of the program and how it supports the college's [College Mission and Diversity Statements](#), [Institutional Priorities, 2008-2013](#), [5 in 5 College Strategies, Spring 2011](#), and other [Institutional Program Planning](#) as appropriate.

The Computer Information Science Department (CIS) 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. The department has the following degrees and certificates:

#### Associate in Science Degrees

- Computer and Information Science (60 units)
- Computer and Network Forensics (60 units)\*
- Computer Science Applications and Development (60 units)

#### Certificates of Achievement

- Computer and Network Forensics (33 units)
- Computer Science Applications and Development (31-34 units)

#### Certificates of Specialization

- C++ Programming (8 units)
- CIS Network Security Specialist (9 units)\*
- Computer Forensics (15 units) \*
- Internet Programming (14-17 units)
- Java Programming (8 units)

\* The Computer Forensics degree and associated certificates will be banked fall 2014. A new *Network Security and Forensics* program is under review as a replacement. A new *Web and Mobile Application Development* degree and certificate will be introduced this year pending State approval. This program is not covered in this review but will require a new computer server when launched (see resource requests).

From the College Mission statement, CIS courses and programs directly support institutional priorities "Promote Academic Excellence" and "Promote Relevant, High-Quality Programs and Services." All courses are certificate-applicable, Associate Degree-applicable, and/or university-transferable. Additionally, one course meets the information competency Associate Degree requirement. CIS also supports the institutional priority for "Student Success" by offering courses in both the online and traditional mode and, where possible, in a predictable scheduling pattern.

### 2. Student Learning and Program Data

#### A. Discuss Student Learning Outcomes Assessment

Reflect on recent SLO assessment results for courses and degrees and certificates offered by the program. Identify trends and discuss areas

in need of improvement.

### CIS 110 Individual SLOs' Results and Assessment

SLO 01: *Articulate a general understanding of computers and digital basics.*

Students performed at a 78% level on this assignment. This includes 16% of the students who did not turn in the assignment. This is an early assignment and many students do not yet have their text.

SLO 04: *Select equipment and processes for building a wired or wireless network.*

This assignment is enjoyed by most students and consequently they performed at a 94% level. This includes 8% of the students who did not turn in the assignment.

SLO 05: *Demonstrate effective use of the Internet and World Wide Web.*

Students performed at an 88% level on this assignment. This includes 11% of the students who did not turn in the assignment.

SLO 06: *Recognize, create, and manipulate digital media.*

This assignment is enjoyed by most students and consequently they performed at a 94% level. This includes 8% of the students who did not turn in the assignment.

**110 ASSESSMENT:** Evidence shows that those students who read the chapter and complete the labs are nearly 100% successful in accomplishing the student learning outcome(s). This suggests the instructional materials and teaching methodology are sound. What appears to be a problem is getting all students to engage in class assignments. This said, CIS 110, overall success rate is increasing and the online performance matches that of the face-to-face sections. One issue that continues to be troublesome is that more and more students are using MACs for this course. The text and the course material is more geared toward the PC, but to assist MAC using students, it would be helpful for faculty to have a MAC.

SLOs found in the first two weeks of the course are difficult to assess. Many students do not yet have their textbooks. It is a very unfortunate situation that Vets and financial aid students cannot get their books more readily. The instructors will continue to make copies available in the Learning Center and Library, but some course materials cannot be provided such as access to the publisher's website.

### CIS 114 Individual SLOs' Results and Assessment

SLO 1: *Develop interactive Web applications that integrate HTML with JavaScript using event handlers.* 100% of the students completing the assignment met the criterion.

SLO 2: *Explain object-based programming and the Document Object Model (DOM).* 84.6% of the students answering the exam question met the criterion.

SLO 3: *Create JavaScript applications that use cookies to track and save Web preferences.* 92.3% of the students completing this midterm exam program met the criterion.

SLO 4: *Develop interactive Web applications that integrate client- and server-side programming using JavaScript and a server-side language.* 100% of the students completing the assignment met the criterion.

SLO 5: *Employ XMLHttpRequest to fetch XML, RSS, or JSON data asynchronously from the server.* 100% of the students completing the assignment met the criterion.

SLO 6: *Explain Ajax design patterns and illustrate how they are used to create various Ajax applications.* 93.75% of the students answering the exam question met the criterion.

SLO 7: *Create an advanced project using the various Ajax technologies, with attention to security and performance.* 100% of the students completing the assignment met the criterion.

**114 ASSESSMENT:** Students who participate in this online class succeed. Students who do not participate do not succeed. Most students are working fulltime. CSM counselors have finally stopped incorrectly advising students to take CIS 114 without the recommended preparation, so there was only one unprepared student enrolled in fall 2013. All SLO results are the same or better than previous semesters. Now that the instructor has a Mac laptop, students using Macs are currently supported.

The majority of students who drop or withdraw from the class are conscientious A or B students who, for personal reasons, feel they no longer have adequate time to devote to the coursework. A minority of students feel that they have purchased the course material by registering, and will continue to log into WebAccess without doing any of the required work or taking any tests or exams. They often state that they don't mind getting a grade of F or NP. If dropped from the class they will occasionally insist on reinstatement, complaining to the

registrar and/or the dean. This negatively impacts the success rate.

### **CIS 255 Individual SLOs' Results and Assessment (Instructor 1)**

*SLO 01: Analyze and explain the behavior of programs involving the fundamental program constructs.* 86.6% of the students answering the test question met the criterion.

*SLO 02: Write short programs that use the fundamental program constructs including standard conditional and iterative control structures.* 100% of the students completing the lab met the criterion.

*SLO 03: Identify and correct syntax and logic errors in short programs.* 100% of the students completing the lab met the criterion.

*SLO 04: Write short programs using arrays.* 100% of the students completing the lab met the criterion.

*SLO 05: Design and implement a class based on attributes and behaviors of objects.* 100% of the students completing the lab met the criterion.

*SLO 06: Construct objects using a class and activate methods on them.* 100% of the students completing the lab met the criterion.

*SLO 07: Use static and instance members of a class properly.* 80% of the students completing the final exam program met the criterion.

*SLO 08: Identify and describe value, scope and lifetime of a variable.* 84.8% of the students answering the test question met the criterion.

*SLO 09: Describe the parameter passing mechanisms and method overloading.* 84.8% of the students answering the test question met the criterion.

*SLO 10: Analyze and explain is-a relationships among objects using a class hierarchy and inheritance.* 100% of the students completing the lab met the criterion.

**255 ASSESSMENT:** Absenteeism is the predominant factor leading to non-success in CIS 255. Because the class is a hybrid class that meets for three hours of lecture once a week, missing even a single class results in missing an entire week's lecture. It can be difficult for students to make up missing material. The lab portion is completed online. Students who regularly attend lecture generally succeed, meeting all SLOs. More than half of enrolled students are working full-time.

### **CIS 255 Individual SLOs' Results and Assessment (Instructor 2)**

*SLO 01: Demonstrate understanding of the principal object-oriented programming concepts.* 90% of students answered these test questions correctly.

*SLO 02: Employ Unified Modeling Language (UML) notation to model the object-oriented design of a non-trivial computer program.* 97.4% of the students completing the assignment met the criterion.

*SLO 03: Implement a medium-size computer program that is stylistically and functionally correct, based on an object-oriented design model.* 80.3% was the average grade of students completing this assignment.

*SLO 04: Reuse existing components through inheritance and polymorphism.* Students writing this program on a test had an 85% success rate.

*SLO 05: Implement, test and debug simple recursive functions.* Students had an 82.7% average on this assignment.

*SLO 06: Understand and employ basic sorting and searching algorithms.* The average grade on this assignment was 80.3%. The final exam question had an 80% success rate.

*SLO 07: Perform exception handling.* The average grade on this assignment was 80.3%

*SLO 08: Use and create standard API documentation for classes and methods.* 100% of students completing the assignment did this correctly.

**255 ASSESSMENT:** No immediate changes are planned.

### **CIS 278 SLOs and individual results**

*SLO 04: Reuse existing components through inheritance and polymorphism.* Students performed at a 92% level on the programming project used to measure this SLO. This is a 10% improvement since the last assessment cycle, indicating that introducing the topic sooner in the course has had a positive effect.

*SLO 05: Implement, test and debug simple recursive functions.* Students performed at a 90% level on the programming project used to measure this SLO. This is consistent with the last measurement of this SLO, however it is noted that online students do not score as high as the traditional students.

**278 ASSESSMENT:** Given the difference of performance between the online and face-to-face sections of this course, the instructor will develop more exercises, examples, and demonstrations to recursion.

### **CIS 256/279 Individual SLOs' Results and Assessment**

SLO's for this course are measured as one, as these cross-listed courses are essentially the same. The two courses cover the same theory, the only difference being that students code their projects in different languages.

*SLO 05: Determine the appropriate data structure to utilize for storing a quantity of data, based on the characteristics of the application.* Students performed at a 92% level on the programming project used to measure this SLO. This measurement has improved by 10% since last assessment.

*SLO 06: Determine the appropriate implementation of a data structure to utilize in an application, based on time/space trade-offs.* Students performed at a 94% level on the exam question used to measure this SLO.

*SLO 07: Construct reliable, robust, object oriented solutions to problems involving the storage, retrieval and update of large quantities of data.* Students performed at a 97% level on the programming project used to measure this SLO.

*SLO 08: Communicate productively in a team software development project.* 100% of student debrief surveys indicated that their technical communication skills grew as a result of the team project.

**256/279 ASSESSMENT:** No immediate changes are planned.

### **DEGREE mapping of course SLOs**

The CIS department has Objectives and SLOs for its A.S. degrees as shown below. The class SLOs listed above are mapped into the A.S. degree SLOs.

#### **Technical Competency**

1. Apply computer science concepts to design and implement software solutions to problems:

SLO – Students will demonstrate the ability to use computer science concepts and program matching skills to design and implement software solutions to problems.

CIS 114 SLOs 1, 4, 7 -- CIS 254 SLOs 2, 4, 5 -- CIS 255 SLOs 3, 4 -- CIS 278 SLOs 4, 5 -- CIS 256/279 SLOs 5, 6, 7

2. Use a variety of software tools, operating systems and/or computer languages:

SLO – Students will have the ability to use a variety of software tools, operating systems, and/or computer programming languages.

CIS 114 SLOs 1, 4, 5, 7 -- CIS 254 SLOs 2, 9 -- CIS 255 SLOs 4, 5 -- CIS 278 SLOs 4, 5 -- CIS 256/279 SLOs 5, 7

3. Acquire new technological skills by building upon discipline fundamentals:

SLO—Students will have an understanding of how to obtain information on computer concepts and discipline details. This understanding will provide them with the foundation necessary to pursue further learning.

CIS 110 SLOs 1, 2, 3, 4 -- CIS 114 SLO 7

#### **Interpersonal Skills**

4. Verbally communicate ideas and concepts clearly in an organized manner:

SLO – Students will demonstrate the ability to verbally communicate ideas and concepts clearly and in an organized manner.

CIS 110 SLOs 1, 5, 6 - CIS 255 SLO 8 -- CIS 256/279 SLO 8

5. Write clear system documentation, user documentation and research papers and/or posters:

SLO – Students will demonstrate the ability to write clear system documentation, user documentation, and research papers and/or posters.

CIS 114 SLO 7 -- CIS 254 SLO 5 -- CIS 255 SLO 2, 8 -- CIS 278 SLOs 4, 5 -- CIS 256/279 SLOs 5, 7

6. Work as a team member in a problem solving situation:

SLO – Students will demonstrate the ability to work as a team member in a problem-solving situation.

CIS 254 SLO 5 -- CIS 255 SLO 8 -- CIS 256/279 SLO 8.

**Professional Awareness**

7. Be aware of their professional responsibilities regarding key ethical issues effecting computer science:

SLO – Student will be aware of key ethical issues affecting computer science and their responsibilities as computer science professionals.

CIS 110 7

**SUMMARY Assessment**

ISSUES	PROPOSED SOLUTIONS
Inability to develop and test MAC materials.	Get instructor a MAC to use (in addition to her PC).
Engaging students in distance delivery mode.	Develop more interactive course materials. To assist in this, order the software <i>Camtasia</i> for all CIS faculty.
Absenteeism	<i>Camtasia</i> could potentially help with this too, if instructor records the face-to-face lectures.
Delayed funding for texts of Vets and financial aid students.	Perhaps the college can float these students a short term loan for such things as access to Publishers' Websites.
Apathy regarding grade	The numbers produced by PRIE simply do not tell the entire story. This is particularly true in CTE classes. This should be recognized and not negatively reflect on the instructor and/or department. If a life-long learner decides they are not concerned about the grade, there really is nothing an instructor can do.

**B. Student Success Indicators**

1. Review **Student Success and Core Program Indicators** and discuss any differences in student success indicators across demographic variables. Also refer to the **College Index** and other relevant sections of the **Educational Master Plan: Update, 2012**, e.g., Student Outcomes and Student Outcomes: Transfer. Basic Skills programs should also refer to **ARCC** data.

The CIS department continues to offer approximately 40 sections of 17 courses each year. This past year 2012-2013 shows a headcount increase of over 27% which has brought the department's productivity index to over 525. Student Success Indicators for the CIS department have improved over the past three years. Success percent is now at 60.3%. Retention-percent is 74% and Withdraw percent is 26%. This leaves CIS shy of the college percentages of Success 70%, Retention 83.9%, and Withdraw 16.1% . However, as stated, it does show improvement and a trend toward the right direction.

STUDENT SUCCESS INDICATORS	Academic Year		
	10-11	11-12	12-13
Success %	56	55	60.3
Retention %	73.3	73.2	74

Withdraw %	26.7	26.8	26
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CIS student ethnicity falls primarily into two groups, Asian (22.3%) and White (40.2%). This has remained constant over the past three academic years and very closely mirrors the county's demographics. The success rate of the Asian students has increased significantly from 53.7% in 2011-2012 to 68.9% in 2012-2013. White students' success has increased 5.6% since 2010-2011. Over 65% of CIS students are between 19 and 29 years old. There are a few students over 50 years old who primarily enroll in the Networking courses. Male students outnumber females 3 to 1. This has been fairly consistent for years.

2. Discuss any differences in student success indicators across modes of delivery (on-campus versus distance education). Refer to [Delivery Mode Course Comparison](#).

Seven courses have sections of both online and face-to-face and the remaining courses (currently ten and increasing) are exclusively taught online.

The only course taught primarily face-to-face has a 65.3% Success rate and a 75.2% Retention rate. This course, CIS 254, is deliberately delivered in mainly the face-to-face mode because faculty consider the material covered here inappropriate for online delivery. This is reinforced by the Student Success Indicators that are slightly higher than those associated with the exclusively online courses.

Of the courses taught in both the traditional and online modes (CIS 110, 110, 255/278, and 256/279) the Student Success Indicators vary from course to course. In CIS 110 the Success and Retention rates of the online sections are almost identical to those of the face-to-face sections. In CIS 111 the rates are quite different with the face-to-face sections showing much higher Success and Retention rates.

COURSE	Distance	Traditional
CIS 110 %Success	62.2	63.9
CIS 110 %Retention	84.4	83.5
CIS 111 %Success	46.4	65.0
CIS 111 %Retention	65.2	70.0

CIS 255/278 and CIS 256/279 are taught differently and require further explanation. These courses represent Computer Science I and II (CS1 and CS2), both are taught in computer programming languages Java and C++. CIS 255 (Java) and CIS 278 (C++) is the equivalent of CS1. CIS 256 (Java) and CIS 279 (C++) is equivalent to CS2.

Assessment data is pooled then averaged. CIS 255/278 has a success rate of 50.45 when delivered in the distance mode, compared to 60.7 in the traditional mode. Retention is 68.15 for the distance mode compared to 71.4 in the traditional mode.

COURSE	Distance	Traditional
CIS 255 %Success	73.2	--
CIS 278 %Success	27.7	60.7
Average Assessment -----	50.45	60.7
CIS 255 %Retention	83.1	--
CIS 278 %Retention	53.2	71.4

Average Assessment	68.15	71.4
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Assessment data is again pooled then averaged for CIS 255/278. It has a success rate of 49.85 when delivered in the distance mode, compared to 92.3 in the traditional mode. Retention is 73.7 for the distance mode compared to 92.3 in the traditional mode.

COURSE	Distance	Traditional
CIS 256 %Success	51.9	92.3
CIS 279 %Success	47.8	--
Average Assessment -----	49.85	92.3
CIS 256 %Retention	77.8	92.3
CIS 279 %Retention	69.6	--
Average Assessment	73.7	92.3

Fifty-eight percent of the department's sections are only taught in the distance mode. Their Success and Retention rates are best represented by the overall department's rates which are a Success of 60.3%, a Retention-percent of 74% and Withdraw percent of 26%. These number are repeated here for the reader's convenience.

STUDENT SUCCESS INDICATORS	Academic Year		
	10-11	11-12	12-13
Success %	56	55	60.3
Retention %	73.3	73.2	74
Withdraw %	26.7	26.8	26

C. Program Efficiency Indicators. Do we deliver programs efficiently given our resources?

Summarize trends in program efficiency as indicated in the [Student Success and Core Program Indicators](#) (LOAD, Full-time and Part-time FTEF, etc.)

CIS's WSCH and FTES have remained essentially constant over the past three years. This year's numbers are WSCH at 4949.7 and FTES at 165. The LOAD for 2012-2013 is 527.7 which is up from 513.5 the year before. This compares to the college average of 539. The full to part-time faculty ratio is decreasing and is now at 55.3% full time faculty. This changing ratio is primarily because of a 2012 full-time faculty retirement who was not replaced. It is also due to a deliberate choice by remaining full-time faculty to have the specialty courses taught by professionals in the field.

Percent Full-time	2010-2011	2011-2012	2012-2013
	70.3	65.5	55.3

### 3. Additional Factors

Discuss additional factors as applicable that impact the program, including changes in student populations, state-wide initiatives, transfer requirements, advisory committee recommendations, legal mandates, workforce development and employment opportunities, community needs. See [Institutional Research](#) as needed.

#### DEMOGRAPHICS

In most ethnic groups the CIS student population closely mirrors the demographics of both the college and the San Mateo county. The group most underrepresented in CIS courses are the Hispanics. This is also true for the college overall. At this time there is no specific plan to increase the student count in any particular ethnic group. Numbers below are shown in percents.

Ethnicity	CSM CIS Students	College Totals	Difference from College	San Mateo County 2010	Difference from State
Asian	22.3	14.5	(+7.8)	18.7	(+3.6)
Black	2.8	4.3	(-1.5)	2.2	(+0.6)
Filipino	5.4	7.0	(-1.6)	--	--
Hispanic	8.7	19.7	(-9.0)	26.6	(-17.9)
Native Am	0.0	0.2	(-0.2)	--	--
White	40.2	30.4	(+9.8)	46.5	(-6.3)
Other	12.6	15.5	(-2.9)	--	--

#### STATE-WIDE INITIATIVES and COMMUNITY NEEDS

*"In 2004, the California Community Colleges Chancellor's Office was authorized by the state legislature to design and implement a performance measurement system that contained performance indicators for the system and for its colleges. This comprehensive system has become known as "ARCC" (Accountability Reporting for the Community Colleges)."*

This State-wide initiative has produced a report that projects there will be employment for those who have Computer Specialist skills. Identifying these skills in the San Mateo County is currently being researched by CIS faculty from all three colleges. The undertaking is funded by the District and will culminate with a newly designed *Computer Specialist* program. This undertaking is covered in more details in other sections of this Program Review.

#### TRANSFER REQUIREMENTS

The transfer requirements for a computer science major changed recently to, once again, include computer architecture into the core curriculum. To address this need, the course has been unbanked and redesigned. This was part of the department's plans in last year's Program Review. The course will be offered fall 2014 for the first time in many years. The matriculation of all CIS transfer courses are under review by CIS faculty and the dean of counseling. This process should be complete by January 2015.

#### GENERALLY SPEAKING

Additional factors that affect the CIS department and students include:

1. Students are often underprepared in the Math/Reading areas, and take courses before they are ready.



2. 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.
3. The ever-changing nature of CIS requires constant retraining and rethinking of curricula. CIS faculty typically spends summer, spring and/or winter break learning new technologies or updating skills.
4. By design, advanced, more specialized courses are often taught by industry professionals who can offer a 'real world' flavor to the material. Finding good technical adjunct who can also teach can be difficult.
5. All of the department's courses are offered in the distance mode. This requires additional attention and consideration so courses are engaging taught at the same level as the face-to-face.

## 4. Planning

### A. Results of Program Plans and Actions

Describe results, including measurable outcomes, from plans and actions in recent program reviews.

Two out of three of our "Plans" for last year's Program Review were supported with Professional Development. They include:

1. Relearn and Re-implement the Banked Computer Architecture Course

#### DESCRIPTION

CIS banked the Computer Architecture class when it was removed from the State's recommended first two-years of Computer Science curriculum. Recent discussions from CSU and UC, however, have determined that Computer Architecture should, again, be taught as part of the core in a student's first two years. This course would be required for the AS-T degree that would become effective 2015-2016. To accommodate this trend, CIS would like to un-bank Computer Architecture and begin teaching it in fall 2015.

#### MEASUREABLE OUTCOMES

The faculty shows signs of being prepared for the course. The official Course Outline and supporting materials were submitted and approved by COI. The course is currently being prepared and uploaded to WebAccess. It is schedule to be taught fall 2014.

2. Learn Android and develop a new online Android course

#### DESCRIPTION

Android is a Linux-based operating system designed primarily for touchscreen mobile devices such as smartphones and tablet computers. A course in this technology will greatly enhance the *Web and Mobile Application Development* AS and certificate offerings in the CIS curriculum. It is the course most requested by web programming and Java students. Application for professional development to learn Android and develop a new course was approved in spring 2013.

#### MEASUREABLE OUTCOMES

The faculty enrolled and completed a course in Android Programming. The official Course Outline and supporting materials were submitted and approved by COI. The course is currently being taught as an experimental course. It is schedule to become a permanent course in 2014-2015.

The third unsupported plan from last year's Program Review was

Create a CIS Course on an "Open Enrollment" Platform

#### DESPRIPTION

The SMCCD is exploring the offering of courses on MOOCs and other open-enrollment courses. The CIS Advisory Committee also recommended the department look at Udacity. There is a need for a department member to become familiar with this new direction, research available CIS courses, and determine if any are appropriate for our curriculum. If there is, then develop an open-enrollment course for fall 2014. At this time, the CIS foundation course, CIS 110 is the most likely candidate.

CIS 110 was not taught as a MOOC or an *XL*Online course. However, five sections of CIS 110 have been pooled into a mega course. The instructor is working with the Course Technology Publisher to establish a MOOC-like version of this course. Further exploration of this will continue through next year.

## B. Program Vision

What is the program's *vision* for sustaining and improving student learning and success over the next three years? Make connections to the [College Mission and Diversity Statements](#), [Institutional Priorities, 2008-2013](#), and other [Institutional Program Planning](#) as appropriate. Address discussion in the Student Learning and Program Data section: SLO assessment results and trends in student success indicators.

**[Note:** Specific plans to be implemented in the next year should be entered in C of the Planning section.

CTE programs must address changes in the context of completion and employment rates, anticipated labor demand, and any overlap with similar programs in the area as noted in D1 and D2 of the Career Technical Education section.]

All three full-time faculty are still implementing last years proposed plans. They are restated here for the reader's convenience.

1. Relearn and Re-implement the Banked Computer Architecture Course
2. Learn Android and develop a new online Android course
3. Create a CIS Course on an "Open Enrollment" Platform

Additionally faculty are involved in an initiative generated by the District to develop a *Computer Specialist* program across the three colleges. This has been detailed in previous parts of this Program Review. As already noted, the goal is to develop a *Computer Specialist* program that meets the county's employment needs. The project starts with an extensive survey of local businesses. Small business assessment will focus on businesses under 100 that employ computer programmers and/or computer support specialist type roles. The following data supports this focus:

### EMSI Data

<i>Position</i>	<i>Annual Projected Openings through 2017</i>
Computer Programmers	17,600 (620 per year)
Computer Occupations (Other)	6,788 (203 per year)
Computer Support Specialists	20,625 (887 per year)

Counties of San Mateo, San Francisco, and Marin

### Small Business Data

Size Categories	Total	0-19	20-49	50-99	100-249	250-499	500-999	1000+
No. of Businesses	82,689	74,752	4,895	1,729	945	222	89	57
No. of Employees	901,137	250,123	148,074	119,809	141,740	74,229	61,245	105,917

Source: CA EDD, Labor Market Information Division, [www.labormarketinfo.edd.ca.gov](http://www.labormarketinfo.edd.ca.gov).

Interviews with small businesses will be led by a Skyline faculty on paid leave funded by the District. Interviews will be conducted in person, at business workplaces.

Based on interview results, a list of required skills will be developed. The required skill sets will be analyzed against existing classes to identify gaps and strengths. A program will be developed accordingly. The assumption is that many program components exist throughout the colleges and could easily be formed/reformed based on skills needed. However, there may also be some the need to develop new curricula. Also based on the interviews, a list or database of companies willing to take internships and advise programs will be developed.

All CSM CIS faculty are involved in this work, but at this time no one has release time. Professional Development may be required if new courses need to be developed.

Finally, the department is exploring the development of a new *Network Security and Forensics* program. The current plan is to bank all the existing Forensic courses, as well as, all related degrees and certificates. This has already been started with an eye to those trailing students finishing the program. If the department decides to move forward with a new *Network Security and Forensics* program, there will be much work to do. Professional Development time will be needed to complete the overall design and paperwork. Later Professional Development time may be needed to develop new courses.

#### GENERALLY SPEAKING

The Computer and Information Science department will continue to build on its strengths to provide an educational experience that is appropriate to the needs of the community and the computer industry by:

- Continuing the department's commitment to robust programs in transfer and occupational education.
- Supporting and retaining the best faculty and staff.
- Strengthening partnerships with businesses and industry through the Advisory Board,
- Providing a welcoming and intellectually stimulating environment to both the online and campus students.
- Endorsing, supporting and actively pursuing a policy of inclusiveness of all ethnic groups and other diversities.
- Supporting institutional needs identified through program review for updating facilities and equipment to enhance learning environments.

1. To guide future faculty and staff development initiatives, describe the professional activities that would be most effective in carrying out the program's vision to improve student learning and success.

The department's efforts this year will be distributed over three areas: the completion of last year's proposed plans, the exploration of a new District-wide *Compute Specialist* program, and the exploration of a new *Network Security and Forensics* program. No additional funding or release time is required for finishing last year's plans. It is difficult to know the explicit professional activities that will be needed for the *Computer Specialist* and *Network Security and Forensics* programs. Fall 2014 will be spent researching the areas and determining if the program(s) will move forward. It is fairly certain that at least one, if not both of these programs will come to fruition. It is also likely that release time funding will be needed to complete the design, paperwork, and implementation of the program(s). Consequently this Program Review will ask for funds on a project that is not yet fully defined. It is the hope of the department that if the exploration phase exceeds the submission deadline for Professional Development, the Division could allocate release time for these projects.

2. To guide future collaboration across student services, learning support centers, and instructional programs, describe the interactions that would help the program to improve student success.

There are two issues for which the department could receive better service from the Learning Resources on campus.

1. TUTORING – Firstly, the department is extremely grateful to the Learning Center for providing CIS students tutoring. It is, however, the hope of the department that occasionally a tutor could be provide **in the CIS computer laboratory (B19)**. It is here that students clamber for help beyond what the instructor can provide.
2. TEXTS/COURSE MATERIALS – Again, the department is grateful to the Learning Centers for its efforts to provide CIS students current textbooks. What is missing, as mentioned, earlier in this review is early access to Publisher Websites. This is especially important to the Vets and financial aid students who often spend the first few weeks of the semester waiting for their funding. These students are at an extreme disadvantage without access to the publishers supporting websites.

The department will continue its communications with the CSM Career Services to better serve CIS students regarding jobs and internships. Faculty will also continue to work with the Learning Center to keep them supplied with appropriate textbooks and computer science tutors.

3. To guide the **Institutional Planning Budget Committee** (IPBC) in long-range planning, identify any major changes in resource needs anticipated during the next three years. Examples: faculty retirements, equipment obsolescence, space allocation.

See the Resource Requests section below to enter itemized resource requests for next year.

Leave sections blank if no major changes are anticipated.

Faculty

There are no plans to hire a full time faculty. Finding good adjunct is an ongoing process.

Equipment and Technology

The CIS Computer lab is located in building 19, rooms 124 and 126. It is open to all students but priority is given to CIS, ENGR, DRAF, BUSW students. There are 45 desktop computers and 2 printers that will need replacing within the six year cycle. This is covered in more detail in the lab Program Review.

Additionally each faculty will need new high-end computers within this timeframe. One instructor needs a MAC computer in addition to her PC.

Instructional Materials

The beginning programming classes use robots for instruction. These will need to be maintained and possibly replaced within the next six years.

Classified Staff

This fall the CIS department hired a new Computer Lab Instructional Aide, Zorigt Bazarragchaa. This ended a long search and completed our staff needs.

Facilities

In all the recent upgrades to the campus facilities, it seems building 19 has been virtually ignored. CIS classrooms and computer labs are far from state-of-the-art or innovative. Building 19 has extremely poorly maintained restrooms. Many students and faculty walk to neighboring building to avoid using these facilities. The building would also greatly benefit from a student sitting area for groups to congregate, socialize, and study. Most other building on campus provides this for students, but not building 19.

C. Program Plans and Actions to Improve Student Success

Prioritize the plans to be carried out next year to sustain and improve student success. Briefly describe each plan and how it supports the **Institutional Priorities, 2008-2013**. For each plan, list actions and measurable outcomes. (Plans may extend beyond a single year.)

**Plan 1**

Title:

- 2013 -- Relearn and Re-implement the Banked Computer Architecture Course
- 2013 -- Learn Android and develop a new online Android course
- 2013 -- Create a CIS Course on an "Open Enrollment" Platform

Completion of last year's plans 1 (Stacey Grasso), 2 (Melissa Green), and 3 (Martha Tilmann)

Description

Projects 1 & 2 involved the development of new courses. They were funded last year by Professional Development. As covered in a previous section of this Program Review, most of the work has been completed, but faculty will finish the project this fall by offering the

newly developed courses. Project 3 did not get funded but was pursued as a Mega class with assistance from the Course Technology publisher. Work on this continues.

Action(s)	Completion Date	Measurable Outcome(s)
Teach the two newly developed courses. Teach newly formatted mega class.	Fall 2014 Spring 2015	SLOs will be assessed and appropriate changes made to better serve students.

**Plan 2**

Title:  
Development of a District-wide Computer Specialist Program

Computer Science faculty across the District will participate in this initiative.

NOTE: It is not yet clear if Professional Development (PD) will be required to complete this project. Because the PD proposal deadline may pass before the work load is known, it may be necessary for the District or college to fund this project from other sources.

Description

Computer Science (CS) faculty are involved in an initiative generated by the District to develop a *Computer Specialist* program across the three colleges. Motivated by state and local data indicating there will be job growth in this area, the CS faculty, supported by the District, has launched an extensive survey of local businesses. Data collected will be used to design and implement a program that meets the county's needs in this area. Professional Development or some other source of funding will be required if this involves the development of new courses, and/or major overhauls of existing classes.

Action(s)	Completion Date	Measurable Outcome(s)
Computer Science faculty (funded by the District) surveys local small business.	Summer 2014 -- Fall 2014	Report showing the results of the small business survey.
All District CS faculty meet to develop a <i>Computer Specialist</i> program that meets the community needs.	Fall 2014	A curriculum design for the new <i>Computer Specialist</i> program. Appropriate COI paperwork submitted.
Selected faculty complete the preparations to offer new and/or overhauled courses.	Spring 2015	Faculty are prepared to teach new curriculum.
Officially begin the new program	Fall 2015	New <i>Computer Specialist</i> program is launched.

**Plan 3**

Title:  
Development of a new *Network Security and Forensics* Program

Faculty: Stacey Grasso

NOTE: Professional Development (PD) will be required to complete this project. Because the PD proposal deadline may pass before the plan is fully developed and the work load is known, it may be necessary for the Division or college to fund this project from other sources.

Description

The CIS department has been phasing out the *Computer Forensics* program. Students who are currently enrolled are being shepherded through their final courses. Forensics courses and programs, as indicated in other parts of this report, are being banked. This effort has been accompanied by the exploration of a new *Network Security and Forensics* program that is better tailored to today's industry needs. If after further research and discussion, the department decides to pursue this program, Professional Development or some other source of funding will be required if this involves the development of new courses, and/or major overhauls of classes.

Action(s)	Completion Date	Measurable Outcome(s)
Computer Science faculty, with assistance from the CIS computer lab aide, research the project.	Spring 2014	Report showing the results of the exploration.
CIS faculty design a <i>Network Security and Forensics</i> program.	Fall 2014	A curriculum design for the new <i>Network Security and Forensics</i> program. Appropriate COI paperwork submitted.
Selected faculty complete the preparations to offer new and/or overhauled courses.	Spring 2015	Faculty are prepared to teach new curriculum.
Officially begin the new program	Fall 2015	New <i>Network Security and Forensics</i> program is launched.

**5. Resource Requests**

Itemized Resource Requests

List the resources needed for ongoing program operation.

Faculty

**NOTE:** To make a faculty position request, complete [Full-time Faculty Position Request Form, AY 2013-2014](#) and email to your Dean. This request is separate from the program review.

Full-time faculty requests	Number of positions
NONE	







## Career and Technical Education courses must be updated every two years.

Degrees/Certificates to UPDATE	Faculty Contact	Action	Submission Date
AS: Computer and Information Science	---	No Action	----
AS: Computer and Network Forensics*	Tilman	BANK	Fall 14
AS: Computer Science Applications and Development	---	No Action	----
AS: Web and Mobile Application Development (NEW)	Green	Waiting State Approval	??
CA: Computer and Network Forensics*	Tilman	BANK	Fall 14
CA: Computer Science Applications and Development	---	No Action	----
CS: C++ Programming	---	No Action	----
CS: CIS Network Security Specialist	Tilman	BANK	Fall 14
CS: Computer Forensics	Tilman	BANK	Fall 14
CS: Internet Programming	---	No Action	----
CS: Java Programming	---	No Action	----

Courses to UPDATE		Faculty Contact	Submission Date
CIS 110	INTRODUCTION TO COMPUTER AND INFORMATION SCIENCE	Tilman	Fall 14
CIS 111	INTRODUCTION TO INTERNET PROGRAMMING	Green	Fall 14
CIS 113	INTERNET PROGRAMMING: RUBY	Green	Fall 14
CIS 114	INTERNET PROGRAMMING: JAVASCRIPT/AJAX	Green	Fall 14
CIS 117	INTERNET PROGRAMMING: PYTHON	Green	
CIS 121	UNIX/LINUX	Tilman	Fall 14
CIS 125	VISUAL BASIC I	Tilman	Fall 14
CIS 127	INTERNET PROGRAMMING: HTML5 and CSS	Green	Fall 14
CIS 128	MOBILE WEB APP DEVELOPMENT	Green	Fall 14

CIS 132	INTRODUCTION TO DATABASES	Green	Fall 14
CIS 135	ANDROID	Green	Fall 15
CIS 151	NETWORKS AND DIGITAL COMMUNICATION	Green	Fall 14
CIS 200	CAPSTONE PROJECT - CIS	Green	Fall 14
CIS 254	INTRODUCTION TO OBJECT-ORIENTED PROGRAM DESIGN	Grasso	Fall 15
CIS 255	(CS1) PROGRAMMING METHODS: JAVA	Grasso	Fall 15
CIS 256	(CS2) DATA STRUCTURES: JAVA	Grasso	Fall 15
CIS 264	COMPUTER ARCHITECTURE	Grasso	Fall 15
CIS 278	(CS1) PROGRAMMING METHODS: C++	Grasso	Fall 15
CIS 279	(CS2) DATA STRUCTURES: C++	Grasso	Fall 15
CIS 363	ENTERPRISE DATABASE MANAGEMENT WITH MySQL	Green	Fall 14
CIS 364	ENTERPRISE DATA WAREHOUSING	Grasso	Fall 15
CIS 379	INTERNET PROGRAMMING: XML	Green	Fall 14
CIS 380	INTERNET PROGRAMMING: PHP	Green	Fall 14
CIS 420	PROJECT MANAGEMENT PROFESSIONAL CERTIFICATE PREPARATION	Grasso	Fall 14
CIS 479	NETWORK SECURITY FUNDAMENTALS	Green	Fall 14
CIS 489	COMPUTER FORENSICS	Tilman	Fall 14 (to be banked)
CIS 490	COMPUTER FORENSICS: NETWORK ANALYSIS AND DEFENSE	Tilman	Fall 14 (to be banked)
CIS 491	COMPUTER FORENSICS: SEARCH AND SEIZURE	Tilman	Fall 14 (to be banked)
CIS 492	COMPUTER FORENSICS: WHITE-COLLAR CRIME	Tilman	Fall 14 (to be banked)

## B. Website Review

Review the program's website(s) annually and update as needed.

Faculty contact(s)	Date of next review/update
Stacey Grasso (faculty)	Last updated: 12/13
Michelle Schneider (Division input person)	Updated as needed.

C. SLO Assessment Contacts

Faculty contact(s)	Date of next review/update
Melissa Green	Spring 15, Ongoing
Stacey Grasso	Spring 15, Ongoing
Martha Tilmann	Spring 15, Ongoing
Lilya Vorobey (Division input person)	Ongoing