University of La Verne

La Verne, California

Program Review

Computer Science and Computer Engineering

2004-2005 Fiscal year

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Executive Summary

The Computer Science program is one of the three programs that collectively comprise the Mathematics/Physics/Computer Science Department with three full-time and four part-time faculty. Since 1993 under the leadership of the current Program Chairperson, the Computer Science and Computer Engineering program has introduced the following four concentrations to the major: Engineering, Information Science, Software, and Web Computing.

The Computer Science and Computer Engineering major requires a minimum of 48 semester hours in the major. Students are required to complete the Core requirements, one concentration, and a minimum of two elective courses. In addition, students are required to satisfy the supportive requirements. There are 56 majors in the program during the 2004-2005 academic year. This number is down a little from the two previous academic years, with 68 majors in 2003-2004 and 78 majors in 2002-2003.

Learning objectives of the program include the following: acquire basic knowledge, communicate effectively, acquire leadership and project management skills, analyze and solve problems, become competent to work in variety of environments in the industry.

Assessment procedures included, senior exit and alumni surveys, focus groups and SWOT interviews, senior comprehensive exams, senior project document and presentation analysis, course evaluations and syllabus reviews. Highlights of findings are as follows:
1. Faculty is considered to be caring, qualified and challenging, but need to keep up to date with a rapidly developing field.
2. All students scored over 60% on the comprehensive exam, suggesting some areas that need attention.
3. Senior projects reflect good application of concepts overall with a need to better document written codes.
4. Great majority (8-9 out of 10) of alumni report being equally or better prepared than their peers in having basic concepts, being flexible and versatile, having project management skills, analyzing and solving problems.
5. Syllabus and curriculum review indicate the currency of the program, the need to better articulate course objectives, and dropping of the Engineering component of the program.
6. More variety of courses are needed and some courses need better organization.
7. About 4 out of 5 alumni have pursued further education, and as many are working in the industry.

Highlights of Action Recommendations

1. Create an advisory board.
2. Revise the Program Web Page to be more appealing to prospective students.
3. Provide the Full time faculty members one course release per year to allow them to stay up to date with technology and attend training sessions.
4. Provide full-time faculty members with adequate office space for research.
5. Consider becoming a separate department and changing the name to "Information Science."

6. Consider the possibility of operating under the College of Business.
7. Update and modernize the infrastructure and facilities.
8. Develop multidisciplinary concentrations in graphic design, animation, and digital technologies and develop certificate programs.
9. Formalize and better document the internship program.
10. Introduce new courses to provide flexibility and more focus on "Front end" skills such as webpage, visual basic, Java, C#.
11. Rewrite course outlines to better reflect course objectives and developing technologies.
12. Help senior project students better document code.

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1. Introduction and Program Structure

This document presents a detailed examination program review of the Computer Science and Computer Engineering major at the University of La Verne.

The Computer Science and Computer Engineering undergraduate program is in the Department of Math/Physics/Computer Science and offers a Bachelor's of Science degree in Computer Science and Computer Engineering. In addition, the program offers an e-commerce major. Both majors have the same program chairperson who reports to the Department chair. The department is structured as one academic unit within the Natural Science Division, which also contains the departments of Biology and Chemistry. The Department chair reports to the Division chair who in turn reports to the Dean of the College of Arts and Science. The e-commerce major is not included in the current review process.

The Computer Science major used to be offered at two locations: Athens Greece and Main Campus. The Athens center closed its doors in December 2004. The Athens center is not included in the current review process.

However, the current review process includes the major in the Campus Accelerated Program for Adults (CAPA) as an integral part of the main campus traditional undergraduate program.

1.1 Organizational Overview Timeline

The Computer Science and Computer Engineering department was founded in 1979 by the American Armenian International College (AAIC). The department was structured as one academic unit within the Engineering school, which also contained Electronic Engineering and Optical Engineering. The Computer Science and Computer Engineering department was the strongest of the three. By 1992 the Computer Science and Computer Engineering department graduated 93 students.

In 1993 AAIC closed their doors. The Electronics and Optical Engineering departments were taught out. The Computer Science and Computer Engineering department was transferred to the University of La Verne; it was renamed as a program, and was hosted under Math/Physics/Computer Science department.

Since 1993 under the leadership of the current Program Chairperson, the Computer Science and Computer Engineering program introduced the following four concentrations to the major: Engineering, Information Science, Software, and Web Computing. Students are required to complete the core requirement and specialize by choosing one of the four concentrations.

1.2 Vision Statement

To be a leader in serving the needs of culturally diverse student body, by empowering them with desire for lifelong learning, theoretical, practical, and applied approaches which improve not only their own lives, but also their communities.

1.3 Mission Statement

The mission of the Computer Science and Computer Engineering program is to provide an opportunity for undergraduate students to achieve their highest potential, to prepare undergraduate students for their academic, professional, and personal growth by providing them with a well balanced undergraduate education in Computer science covering theory, application, research, and practice.

2. Curriculum Details

The Computer Science and Computer Engineering major required a minimum of 48 semester hours in the major. The major included 4 concentrations that included: Computer Engineering, Information Science, Software, and Web Computing concentrations. Students are required to complete the Core requirements, one concentration, and a minimum of two elective courses. In addition, students are required to satisfy the supportive requirements. Table 1 represents the course requirement.

Table 1: Computer Science and Computer Engineering Curriculum
A. CORE REQUIREMENTS: CMPN 280: Computer Organization CMPS 367: Object Oriented Language C++ CMPS 368: Principles of Networks CMPS 370: Seminar CMPS 385: Data Structures CMPS 471: Internship Comprehensive Exam
B. CONCENTRATION: **1. ENGINEERING CONCENTRATION:** CMPN 150: Principles of Electronics and Computer Engineering CMPN 202: Electronic Devices and Circuits CMPN 220: Digital logic CMPN 330: Microprocessor Systems CMPN 480: Advanced Computer Architecture CMPN 499: Senior Project
2. INFORMATION SCIENCE CONCENTRATION: CMPN 220: Digital logic CMPS 369: Local Area Networks CMPS 375: Systems Analysis and Design CMPS 410: Management Information Systems CMPS 490: Database Management Systems CMPS 499: Senior project
3. SOFTWARE CONCENTRATION: CMPN 220: Digital logic CMPS 454: Automata Theory CMPS 455: Compiler Design CMPS 460: Operating Systems CMPS 490: Database Management Systems CMPS 499: Senior Project.

4. WEB COMPUTING CONCENTERATION:

CMPS 375: Systems Analysis and Design
CMPS 379: Java
CMPS 463: Computer Graphics
CMPS 480: Distributed and Web Based Computing
CMPS 490: Database Management Systems
CMPS 499: Senior project

C. ELECTIVES - A minimum of two courses from the following or from a concentration outside the chosen one:

CMPN 303: Integrated Electronics
CMPS 318: Publishing on the Web
CMPS 362: Numerical Algorithms
CMPS 371: Assembly Language
CMPS 376: Small Talk
CMPS 377: Visual Basic
CMPS 380: ADA Programming Language
CMPS 392: Project Management
CMPS 400: Analysis of Algorithms
CMPS 451: Artificial Intelligence
CMPS 465: Programming Languages
CMPS 475: Systems Design Process
CMPS 495: Information Systems Project

D. SUPPORTIVE REQUIREMENTS:

CMPS 301: Programming Concepts
MATH 201: Calculus I
MATH 327: Discrete Mathematics

1. Additional courses for Engineering Concentration:

CHEM 201: General Chemistry I
MATH 202: Calculus II
PHYS 201: General Physics I or PHYS 203: Engineering Physics I
PHYS 202: General Physics II or PHYS 204: Engineering Physics II

1. Additional courses for Information Science Concentration:

ECBU 201: Fund. Of Accounting I or ECBU 203: Fin. & Mgmt Acc.
ECBU 221: Economic Analysis II or ECBU 328: Econ. Theories & Is.
ECBU 350: Principles of Management
PHYS 201: General Physics I or PHYS 203: Engineering Physics I

2. Additional courses for Software Concentration:

MATH 202: Calculus II
PHYS 201: General Physics I or PHYS 203: Engineering Physics I
PHYS 202: General Physics II or PHYS 204: Engineering Physics II

3. Additional courses for Web Computing Concentration:

MATH 351: Probability
MATH 362: Numerical Algorithms
PHYS 202: General Physics II or PHYS 204: Engineering Physics II

3. Objectives / Assessment / Analysis / Findings

The Computer Science and Computer Engineering program identified 10 major educational objectives and implemented numerous assessment processes to monitor the progress against its objectives. The program used the results of the assessments to assist in the decision making process of future improvements.

Detailed descriptions of the project objectives and assessment processes are presented in the section bellow.

3.1 Program Objectives

Students majoring in Computer Science and Computer Engineering will

1. Acquire basic concepts in software, engineering, and information science.
2. Communicate effectively both orally and in writing to their peers.
3. Acquire leadership skills and collaborate in team projects.
4. Demonstrate skills in analyzing problems before and during a project.
5. Acquire project management skills including data collection, time management, and self-teach new application.
6. Be prepared to do research and problem solving skills independently.
7. Be prepared to go to graduate schools.
8. Obtain a sense of "urgency" to meet deadlines.
9. Be flexible to function in a variety of work environments.
10. Be prepared to get jobs in industry related to concentration area such as, Computer Engineering, Software Engineering, Information Science, and Web Computing.

3.2 Program Assessment

This section covers the Program Objectives Assessment, various program Assessment procedures, and Periodic Assessments.

3.2.1 Program Objectives Assessment

Purpose: The purpose of program objectives assessment was to ensure the achievement of the integration and the implementation of the program objectives in the curriculum. The findings of this exercise identified the strengths, opportunities, and challenges of the Computer Science program at the University of La Verne as part of a periodic overall program review process.

Participants: There were a total of 5 people involved in this exercise: 3 full time Computer Science faculty members, 1 administrative assistant, and 1 Associate Dean.

Procedure: The committee met on a weekly basis in Fall 2004. The Associate Dean acted as the facilitator of the committee, the administrative assistant kept the records, and the faculty members brainstormed, devised, and analyzed the program objectives.

Method: The program objectives were analyzed in detail. The committee identified the courses that fulfill the program objectives. Moreover, they provided the actions taken to achieve the objectives.

The courses that addressed the specific program objectives were summarized and presented in Table 2.

Table 2: Program Objectives and Equivalent Courses	
Program Objective	***Equivalent courses***
1: Basic Concepts Skills	CMPN 280: Computer Organization CMPS 301: Programming Concepts CMPS 367: Object Oriented Language C++ CMPS 368: Principles of Networks CMPS 385: Data Structures CMPS 455: Compiler Design CMPS 460: Operating Systems CMPS 471: Internship
2: Communication Skills	CMPN 220: Digital logic CMPN 280: Computer Organization CMPS 368: Principles of Networks CMPS 369: Local Area Networks CMPS 375: Systems Analysis and Design CMPS 385: Data Structures CMPS 392: Project Management CMPS 410: Management Information Systems CMPS 451: Artificial Intelligence CMPS 455: Compiler Design CMPS 460: Operating Systems CMPS 465: Programming Languages CMPS 471: Internship CMPS 490: Database Management Systems CMPS 499: Senior project
3: Leadership and Collaboration Skills	CMPN 220: Digital logic CMPN 280: Computer Organization CMPS 368: Principles of Networks CMPS 369: Local Area Networks CMPS 375: Systems Analysis and Design CMPS 392: Project Management CMPS 410: Management Information Systems CMPS 460: Operating Systems CMPS 490: Database Management Systems CMPS 499: Senior Project.
4: Analysis Skills	CMPN 220: Digital Logic CMPN 280: Computer Organization CMPS 301: Programming Concept CMPS 367: Object Oriented Language C++ CMPS 385: Data Structures CMPS 451: Artificial Intelligence CMPS 455: Compiler Design CMPS 460: Operating Systems CMPS 490: Database Management Systems CMPS 499: Senior Project

5: Project Management Skills	CMPS 375: Systems Analysis and Design CMPS 392: Project Management CMPS 410: Management Information Systems CMPS 490: Database Management Systems CMPS 499: Senior project
6: Research and Problem Solving Skills	CMPN 280: Computer Organization CMPS 368: Principles of Networks CMPS 369: Local Area Networks CMPS 410: Management Information Systems CMPS 460: Operating Systems CMPS 499: Senior Project
7: Graduate School preparation & Life Long Learning	Bachelor's degree in Computer Science and Computer Engineering with a concentration. General Education requirements.
8: Time management Skills	CMPN 220: Digital Logic CMPN 280: Computer Organization CMPS 368: Principles of Networks CMPS 369: Local Area Networks CMPS 375: Systems Analysis and Design CMPS 385: Data Structures CMPS 392: Project Management CMPS 410: Management Information Systems CMPS 451: Artificial Intelligence CMPS 455: Compiler Design CMPS 490: Database Management Systems CMPS 499: Senior Project
9: Versatile	CMPN 280: Computer Organization CMPS 392: Project Management CMPS 465: Programming Languages CMPS 490: Database Management Systems CMPS 499: Senior Project
10: Prepare for Industry	CMPS 471: Internship University of La Verne B.S. in CS or other concentrations

1. *Acquire basic concepts in software, engineering, and information technology.* The courses required to assess basic concepts in software, engineering, and information technology include: CMPN 280 Computer Organization, CMPS 301 Programming Concept, CMPS 367 Object Oriented Language C++, CMPS 368 Principles of Networks, CMPS 385 Data Structures, CMPS 455 Compiler Design, CMPS 460 Operating Systems, CMPS 471 Internship, and CMPS 499 Senior Project.

   The program implemented a comprehensive exam for all seniors to measure this learning outcome. This graduation requirement was

added in 2002. The comprehensive exam was administered for the first time in May 11, 2005. This is an ongoing assessment. See section 2.2.3.2 for details.

2. *Communicate effectively both orally and in writing to their peers.* The courses required to assess effective communication include: CMPN 220 Digital logic, CMPN 280 Computer Organization, CMPS 368 Principles of Networks, CMPS 369 Local Area Networks, CMPS 375 Systems Analysis and Design, CMPS 385 Data Structures, CMPS 392 Project Management, CMPS 410 Management Information Systems, CMPS 451 Artificial Intelligence, CMPS 455 Compiler Design, CMPS 460 Operating Systems, CMPS 465 Programming Languages, CMPS 471 Internship, CMPS 490 Database Management Systems, and CMPS 499 Senior project.

   The Students are required to present their projects and research findings to their classmates at the end of each semester. Students are required to: implement their projects or research, prepare their PowerPoint presentation, write their final report, and make 15-20 minutes presentation to their peers.

   Moreover, the program introduced an Internship program in Fall 2003. Spring 2005 was the first semester where students started enrolling in the internship class (see Appendix A for Internship form). The program intends to survey the employers at the end of the internship. The program considers this assessments as an on going assessment project (see Appendix B for Internship Supervisor Evaluation Form).

3. *Acquire leadership skills and Collaborate in team projects.* The courses required to assess acquire leadership skills and collaborate in team projects include: CMPN 220 Digital logic, CMPN 280 Computer Organization, CMPS 368 Principles of Networks, CMPS 369 Local Area Networks, CMPS 375 Systems Analysis and Design, CMPS 392 Project Management, CMPS 410 Management Information Systems, CMPS 460 Operating Systems, CMPS 490 Database Management Systems, and CMPS 499 Senior Project.

   Students are assigned to teams at the beginning of each semester. Students are required to go through team building exercises, collaborate with their teammates, and acquire leadership skills including conflict management skills.

4. *Demonstrate skills in analyzing problems before and during a project.* The courses required to assess demonstrate skills in analyzing problems before and during a project include: CMPN 220 Digital Logic, CMPN 280 Computer Organization, CMPS 301 Programming Concept, CMPS 367 Object Oriented Language C++, CMPS 385 Data Structures, CMPS 451 Artificial Intelligence, CMPS 455 Compiler Design, CMPS 460 Operating Systems, CMPS 490 Database Management Systems, and CMPS 499 Senior Project.

Students are required to use Simon's model (acquisition, design, choice, and implementation), this includes analyzing systems / problems and creating feasibility studies.

5. *Acquire project management skills including data collection, time management, and self-teach new application.* The courses required assessing project management skills, data collection, time management, and self teach applications include: CMPS 375 Systems Analysis and Design, CMPS 392 Project Management, CMPS 410 Management Information Systems, CMPS 490 Database Management Systems, and CMPS 499 Senior project.

   Students are required to acquire project management skills and apply them in their class projects as well as their senior projects.

6. *Be prepared to do research and problem solving skills independently*. The courses required to assess problem solving skills and research include: CMPN 280 Computer Organization, CMPS 368 Principles of Networks, CMPS 369 Local Area Networks, CMPS 410 Management Information Systems, CMPS 460 Operating Systems, and CMPS 499 Senior Project.

   All programming courses emphasize on problem solving skills. Students are required to do research projects and present their findings to their classmates at the end of each semester. Students are given a research topic list to choose from. Students are encouraged to select their own topics that are relevant to the course.

7. *Be prepared to go to graduate schools.* The program kept track of the graduating class and encouraged the students to pursue graduate school. Some of the Computer Science students have pursued Masters in Computer Science, Masters in Computer Engineering, and Masters in Information Science by attending the following universities: Arizona State, Azusa Pacific, Claremont Graduate, U.C. Long Beach, U.C. Irvine, U.C. Northridge, USC, and Webster University. A number of students chose pursuing MBA and MPA at the University of La Verne.

8. *Obtain a sense of "emergency" meeting deadlines.* The courses required to assess meeting deadlines include: CMPN 220 Digital Logic, CMPN 280 Computer Organization, CMPS 368 Principles of Networks, CMPS 369 Local Area Networks, CMPS 375 Systems Analysis and Design, CMPS 385 Data Structures, CMPS 392 Project Management, CMPS 410 Management Information Systems, CMPS 451 Artificial Intelligence, CMPS 455 Compiler Design, CMPS 490 Database Management Systems, and CMPS 499 Senior Project.

   This outcome was enforced in all the courses in the program. Students learned the skills of operating under pressure and meeting their deadlines by enforcing deadlines for each assignment. Points are

deducted as penalty for late submission and sometimes late assignments are not accepted.

9. *Be flexible to function in a variety of work environments.* The courses required to assess be flexible to function in a variety of work environments include: CMPN 280 Computer Organization, CMPS 392 Project Management, CMPS 465 Programming Languages, CMPS 490 Database Management Systems, and CMPS 499 Senior Project.

   The University of La Verne provides a well rounded Liberal Arts general education. Students were flexible to function in a variety of work environment. In addition, the program encouraged students to minor in different fields to be more versatile during their future career change opportunities.

10. *Be prepared to get jobs in industry related to concentration area such as, Computer Engineering, Software Engineering, Information Science, and Web Computing.* The courses required to assess getting jobs in industry related to concentration include: CMPS 280 Computer Organization, CMPS 367 Object oriented language C++, CMPS 368 Principles of Networks, CMPS 385 Data Structures, CMPS 471 Internship.

    The program provided a well rounded background where students are versatile and flexible to work in different industries. The program tried to keep track of the graduating class work habits. For example, students who had Computer Engineering concentration were able to find jobs in Banks as Information Science fields, etc.

    Moreover, the CMPS 471 Internship course provides the students some industrial experience in their major. Students who graduate with one concentration are able to operate in different concentrations.

Findings: The committee created a matrix of the curriculum and the program objectives in order to graphically summarize and highlight the achievement of the program objectives. Table 3 provides the findings.

Table 3: Program Objective and Corresponding Courses										
	1: Basic Concepts	**2: Communication**	**3: Leadership & Collab.**	**4: Analysis**	**5: Project Management**	**6: Research & Problem Solving Skills**	**7: Graduate School prep. & Life Long Learning**	**8: Time management**	**9: Versatile**	**10: Prepare for Industry**
CMPN 150	X			X			X	X		
CMPN 202	X			X			X	X		
CMPN 220	X	X	X	X	X	X	X	X		
CMPN 280	X	X	X	X	X	X	X	X	X	X
CMPS 279	X			X			X	X		
CMPS 300	X	X	X	X	X	X	X	X		
CMPS 301	X			X			X			
CMPN 303	X			X			X			
CMPS 318	X			X			X			
CMPN 330				X			X			
CMPS 362							X			
CMPS 367	X			X			X			X
CMPS 368	X	X	X			X	X	X		X
CMPS 369	X	X	X			X	X	X		
CMPS 370							X			
CMPS 371	X						X			
CMPS 375		X	X		X		X	X		
CMPS 376	X						X			

CMPS 377	X						X			
CMPS 379	X						X			
CMPS 380	X						X			
CMPS 385	X	X		X			X	X		X
CMPS 392		X	X		X		X	X	X	
CMPS 400				X			X			
CMPS 410	X	X	X		X	X		X		
CMPS 451		X		X			X	X		
CMPS 454	X						X			
CMPS 455	X	X		X			X	X		
CMPS 460	X	X	X	X		X	X			
CMPS 463	X						X			
CMPS 465		X				X	X		X	
CMPS 471		X	X	X	X	X	X	X	X	X
CMPS 480	X	X			X	X	X			
CMPS 490	X	X	X	X	X		X	X	X	
CMPS 495		X	X	X	X	X	X		X	
CMPS 499	X	X	X	X	X	X	X	X	X	X

Usually, the program chair modifies the Computer Science and Computer Engineering program on an annual basis. Table 4 reflects the program objectives with the improvements implemented since Fall 2000.

Table 4: Improvements

Program Objective	***Improvements Identified***	***Improvements Implemented***
1: Basic Concepts Skills	It was determined that C and Pascal programming languages were no longer in demand.	Require *CMPS 367:Object Oriented Language C++* as a core language. The change was implemented in Fall 2000.
7: Graduate School preparation & Life Long Learning AND 10: Prepare for Industry	CAPA required 7 years as graduation deadline for the adult students. Students should be prepared to take the GRE exam to attend graduate school.	Introduced a *comprehensive written exam* as graduation requirement. This applied to students who joined ULV in Fall 2002.
3: Leadership and Collaboration Skills	Students should be involved in real work environment.	Introduced CMPS 471: Internship course as graduation requirement. This applied for students who joined ULV in Fall 2002.
9: Versatile	It was determined that Computer Science students should have the knowledge of designing and implementing a Web page.	Introduced CMPS 279: Java for e-commerce which covered JavaScript in more details. The Change was implemented in Summer 2005.
7: Graduate School preparation & Life Long Learning 9: Versatile 10: Prepare for Industry	The program should expose the students to new topics related to technology (i.e. programming languages, hardware)	CMPS 370: Seminar (1unit) covered such topics. The program would introduce a new course titled “Special Topics” in near future

3.2.2 Assessments Procedures

The program used several procedures to assess the learning outcomes for this self study document. The assessment procedures include: senior exit survey, grade distribution, Alumni survey, focus groups, curriculum comparison, syllabus review, and SWOT analysis.

3.2.2.1 Senior Exit Survey

Purpose: The purpose of the senior exit survey was to gather students' feedback regarding the strengths, opportunities, and challenges of the Computer Science and Computer Engineering program at the University of La Verne as part of a periodic overall program review process.

Participants: Students who signed up for their senior project course were approached by the program to fill out the senior exit survey during their senior project presentation day. Even though Class 2005 consisted of 15 students, there were a total of 7 senior students who volunteered to participate in filling out the senior exit survey. Three students had registered for the course in Spring 2004 and earned an "IP" grade and 4 students had registered in Spring 2005 and were planning on participating in May 2005 graduation ceremony. All participants were male. Three of the students were CAPA students and 4 traditional undergraduate students.

Procedure: The opinions of the Computers Science and Computer Engineering majors were surveyed while they were ready to present their senior projects to their peers in May 2005.

Method: The survey consisted of 3 major parts. First, demographic factual information; second, 5 point Likert scale questions about the program delivery; third, 2 open ended questions. The survey reflected the areas of satisfaction with various aspects of the program and program objective including: Faculty respect for students, Faculty availability, Advisement, Variety of courses, Quality of program, Quality of Instructions, Scheduling of courses, Hands on experience, Class size, Class environments, Preparation for career, Developing problem solving skills, Developing self confidence, Met the goals I came to achieve, Met my accomplishments in this program, Program use of feedback from students, identify the challenges of the computer science program, and identify the strengths of the computer science program. The questions of the survey recommendations for program improvement were also requested (See Appendix C for a copy of the senior exit questionnaire).

Findings: Three of the students who took the survey were of Class 2004. They had earned an "IP" grade on their senior project. They were in the process of presenting their senior project in order to complete their degree.

Table 5 provides the summary of the Senior Exit Survey results.

Table 5: Senior Exit Survey Results	
	n (n=7)
1. Date Completed:	
May 2005	7
2. Expected semester of graduation	
Spring 2004	3
Spring 2005	4
3. Gender	
Male	7
Female	0
4. Campus	
Traditional Undergraduate	4
CAPA	3
5. Number of years at ULV?	
2-2.5 years	2
4 years	4
5 years	1
6 years	1
6. Started ULV as:	
Freshman	3
Transfer	4
7. Plans to continue education:	
a. No plan at this time	0
b. Currently working & no plan for a graduate degree	2
c. Have been accepted into a graduate program	1
d. Definite plan to go to graduate school	4
8. Would you recommend this program to others?	
Yes	7
No	0
9. Currently working in a job that is related to your field?	
Yes	5
No	2
10. Faculty respect for students	
Very Satisfactory	6
Very Unsatisfactory	1
11. Faculty availability	
Very Satisfactory	4
Satisfactory	2

Unsatisfactory	1
12. Advisement	
Very Satisfactory	5
Satisfactory	1
Very Unsatisfactory	1
13. Variety of courses	
Very Satisfactory	2
Satisfactory	4
Unsatisfactory	1
14. Quality of the program	
Very Satisfactory	4
Satisfactory	2
Very Unsatisfactory	1
15. Quality of instructions	
Very Satisfactory	5
Satisfactory	1
Very Unsatisfactory	1
16. Scheduling of courses	
Satisfactory	5
Unsatisfactory	1
Very Unsatisfactory	1
17. Hands on experience	
Very Satisfactory	2
Satisfactory	3
Very Unsatisfactory	1
Not Applicable	1
18. Class size	
Very Satisfactory	5
Satisfactory	1
Very Unsatisfactory	1
19. Class environments	
Very Satisfactory	4
Satisfactory	2
Very Unsatisfactory	1
20. Preparation for career	
Very Satisfactory	3
Satisfactory	2
Unsatisfactory	1
Very Unsatisfactory	1
21. Developing problem solving skills	
Very Satisfactory	5
Unsatisfactory	1
Very Unsatisfactory	1
22. Developing self confidence	
Very Satisfactory	5

Unsatisfactory	1
Very Unsatisfactory	1
23. Met the goals I came to achieve	
Very Satisfactory	4
Satisfactory	1
Unsatisfactory	1
Very Unsatisfactory	1
24. Met my accomplishments in this program	
Very Satisfactory	4
Satisfactory	2
Very Unsatisfactory	1
25. Program use of feedback from students	
Very Satisfactory	3
Satisfactory	2
Very Unsatisfactory	2
26. What do you consider to be the challenges of the computer science program? • Senior Project. • The challenge is staying on track, and working with diverse technologies. • The Lack of classes other than required courses. • Availability of convenient class schedules, better career preparation (i.e. career fairs), better Hardware for labs. • Need of more quality teachers like Seta and Ray. • Limited financial support by ULV administrators in relation to student needs.	
27. What do you consider to be the strength of computer science program? • Project management and software programming. • The faculty works hard and challenges the students. • Great faculty experience. • Quality of teaching from Ray and Seta. • Core faculty members are dedicated to their students within and outside of the classroom setting. • The Faculty	

Out of the seven students, 3 students graduated on May 4, 2004 and 4 students graduated on May 24, 2005. Out of the seven students, 4 students were traditional undergraduate and three were CAPA students. All students who filled out the survey were of male gender.

All students stated that they recommend this program to others. 71% of the students who took the survey stated that they were working in jobs related to their field. 57% of the students plan to go to graduate school and one student had been accepted into a graduate program at the time he took the survey.

The majority of the students were satisfied with the faculty, quality of instruction, advisement, quality of program, and delivery. There was one student who was very unsatisfied with the program.

43% of the students were transfer students and 57% of the students started ULV as freshmen. 29% of the students finished their degrees in 2 years, 43% of the students finished their degrees in 4 years, and 14% of the students finished their degree in 5 years and 6 years. It is worth mentioning that the student who took 6 years to finish his degree had to repeat several of his courses.

57% of the students reported "D) Definitely they plan to go to graduate school". 29% reported "B) Currently working and no plan for a graduate degree." 14% reported "C) Have been accepted into a graduate program."

The areas of concerns included: Scheduling of courses, preparation for career, develop self confidence, and lab equipment.

Table 6 presents the results of questions 8 – 23.

Table 6: Senior Exit Questionnaire Analysis

8. Faculty Respect	9. Faculty Available	10. Advisement	11. Variety	12. Quality program	13. Quality Instruction	14. Scheduling	15. Hands on	16. Classroom Size	17. Environment	18. Preparation Career	19. Problem Solving	20. Self Conf.	21. Met Goals	22. Accomplish	23. Feedback
5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5
2	3	2	3	2	2	2	2	2	2	3	2	2	2	2	2
5	5	5	4	5	4	4	4	5	5	4	5	5	4	4	4
5	5	5	5	5	5	4	4	5	5	4	5	5	5	5	5
5	4	4	4	4	5	3	5	4	4	2	3	3	3	4	2
5	5	5	4	5	5	4	4	5	5	5	5	5	5	5	4
5	4	5	4	4	5	4	1	5	4	5	5	5	5	5	5

86% of the students stated that they were very satisfied with faculty respect for students. 72% of the students were very satisfied with faculty advisement, quality of instruction, classroom size, problem solving skills, and developing self confidence. One student was very unsatisfied with faculty availability, advisement, variety of courses, scheduling, preparation for career, problem solving skills, self

confident, met his goals, and proud of his accomplishments with this program.

Some students preferred having more variety of courses offered in the program, as well as scheduling of courses. This issue would be addressed in the Action plan. Table 7 reflected the percentages of the Senior Exit Questionnaire Analysis.

Table 7: Percentage of Senior Exit Questionnaire Analysis

	8. Faculty Respect	9. Faculty Available	10. Advisement	11. Variety	12. Quality program	13. Quality Instruction	14. Scheduling	15. Hands on	16. Classroom Size	17. Environment	18. Preparation Career	19. Problem Solving	20. Self Conf.	21. Met Goals	22. Accomplish	23. Feedback
5	86%	57%	72%	29%	57%	72%	0%	29%	72%	57%	43%	72%	72%	58%	57%	42%
4	0%	29%	14%	57%	29%	14%	72%	43%	14%	29%	29%	0%	0%	14%	29%	29%
3	0%	14%	14%	14%	0%	0%	14%	0%	0%	0%	14%	14%	14%	14%	14%	0%
2	14%	0%	0%	0%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	0%	29%
1	0%	0%	0%	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%	0%

For question 24, "What do you consider the weakness of the Computer Science program?" the students stated the following: The senior project. The challenge is staying on track, and working with diverse technologies. The Lack of classes other than required courses. Availability of convenient class schedules, better career preparation (i.e. career fairs), better Hardware for labs. Need of more quality teachers like Seta and Ray. Limited financial support by ULV administrators in relation to student needs.

For question 25, "What do you consider to be the strength of Computer Science Program?" the stated the following: Faculty. Project management and software programming. The faculty works hard and challenges the students. Great faculty experience. Quality of teaching from Ray and Seta. Core faculty members are dedicated to their students within and outside of the classroom setting.

For question 26, "Would you recommend this program to others?" all students who filled out the Senior Exit Questionnaire answered that they would recommend the program to others.

3.2.2.2 Grade Distributions

Purpose: The purpose of the grade distributions assessment was to examine the quality of delivery of the program to identify strengths, opportunities, and challenges of the Computer Science and Computer Engineering program at the University of La Verne as part of a periodic overall program review process.

Participants: The program chairperson generated the grade distribution assessment report by using the data from Banner.

Procedure: Grade distributions of courses during the past 2004-2005 academic year were examined. The fiscal year included Fall 2004, January 2005, Spring 2005, and Summer 2005. The frequency of grades was aggregated in table 8.

Method: Table 5 presents summary and frequency of the grade distribution. The first column list courses offered in Fall 2004, Interterm 2005, Spring 2005, and Summer 2005. The second column includes the semester it was offered with the total number of students in the class. The rest of the columns list the frequency of grades granted to students.

Table 8: Grade Distribution Frequency 2004 - 2005															
Courses	**Sem./Total Std**	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**F**	**INC**	**IP**	**CRD**	**NCR**
CMPS 100*	F4		1	1	1										1	
	S10	4	1	1	1	1		1				1				
CMPN 220	F7	1	2		1		2				1					
CMPS 279	SM5	3	2													
CMPN 280	S13	4	1	1	1	4		2								
CMPS 300	S5	1	1	1	1				1							
CMPS 301*	F10	5	1	1			1					1	1			
	S11	5	3	1	1	1										
MATH 327	S16	2		1	2		1	6	2			1			1	
CMPS 367*	F4	1	2										1			
	S8	3			1				2			1	1			
CMPS 368	F14	6	2	3		2										1
CMPS 369	S6	5			1											
CMPS 370	I12	6	5	1												
CMPS 371	I7	3	2		1								1			
CMPS 375	F7	4	1	1	1											
CMPS 379	F9	2	3	1	1	1							1			
CMPS 385	S5	2	1		1			1								
CMPS 392	S11	5	5		1											
CMPS 399	I1	1														
CMPS 410	F14	3	5	4	2											
CMPS 410*	F15	3	2	2	3	1	1		1		1	1				
	S11	4	2	3		1		1								
CMPS 410*	F19	3	4	3	1	2	2	2				2				
Online	S19	4	8			3		1		1			1	1		
CMPS 454	F8	4	2				1	1								
CMPS 455	S8	4	1	2	1											
CMPS 460	S13	3	3	1	1		3	2								
CMPS 471*	I1													1		
	S1	1														
CMPS 490	S17	2		5	5		2	2		1						
CMPS 499*	F5	2												3		
	S5	2												3		
	S2	1												1		

* Offered during Fall and Spring semesters. Numbers = Frequency
F = Fall, I = Interterm, S = Spring, SM = Summer.

Findings: The program offered a total of 34 courses in 2004 – 2005 Fiscal year. Seven courses were offered in Fall 2004 as well as in Spring 2005 semesters. The CMPS 471 Internship, CMPS 399 Independent Study, and CMPS 499 Senior Project courses were offered as Directed Study. There were 303 students registered for

these courses. There were 3 full time faculty members and 3 part time faculty members who taught these courses.

Table 9 provides the percentage of the grade distribution in the Computer Science program for the Fiscal year 2004 – 2005. 52.47% of the grades were in the range of A, 25.41% of the grades were in the range of B, 12.54% of the grades were in the range of C, 1.32% of the grades were in the range of D, 2.31% were F, and 4.96% of the grades were INC and IP.

0.99% of the students earned CRD/NCR grade. This was not a surprise because all students majoring in Computer Science should not sign up for CRD/NCR grade; students had to have letter grades in their major. Unfortunately CMPS 100 was the only non major course offered by the program.

Table 9: Grade Distribution Percentage

	Grade	**Percentage**
1	A	32.67%
2	A-	19.80%
3	B+	10.89%
4	B	9.24%
5	B-	5.28%
6	C+	4.29%
7	C	6.27%
8	C-	1.98%
9	D+	0.66%
10	D	0.66%
11	F	2.31%
12	INC	1.98%
12	IP	2.98%
13	CRD	0.66%
14	NCR	0.33%
	Total:	**100.00%**

3.2.2.3 Alumni Survey

Purpose: The purpose of the alumni survey assessment was to gather the alumni feedback regarding the strengths, opportunities, and challenges of the Computer Science program at the University of La Verne as part of a periodic overall program review process.

Participants: 36 students out of 120 students agreed to participate in this assessment. Thirty were traditional undergraduate students and 6 CAPA students. Ten of the participants were female and 26 were male.

Procedure: Alumni who graduated from ULV with a major in Computer Science and Computer Engineering in the last 20 years were surveyed on-line and on paper. A pilot test was conducted to ensure the content validity and reliability of the instrument. About 120 graduates were contacted by mail and asked to respond to the alumni survey. Students were given the option of taking the survey on paper and mailing it back or taking the survey online and mailing a self addressed card for a $50.00 gift certificate drawing. Students were given an opportunity of winning a drawing of a $50.00 gift certificate from Comp USA. The survey asked students to assess what they learned while at ULV, how well they compared themselves with their peers in terms of what they had learned, employment history, and future plans. Please see Appendix D for a sample of the cover letter, and returned drawing card.

Method: The survey consisted of a total of 54 questions. The questions were themed as follows: demographics, career preparation at ULV, learning outcomes preparation, satisfaction with program, learning specific outcomes compared to peers.

After the surveys were collected, the data was aggregated and analyzed to identify the strengths, weaknesses, and the opportunities in the Computer Science program. See Appendix E for a sample of the Alumni survey and online survey.

The University Relations was approached to have access to the mailing list of all 120 graduates in the program.

Findings: 120 surveys were mailed in January 2005. Only 36 students responded to the survey. There were a number of surveys that they were returned indicating wrong address.

83% of the students who took the survey were Traditional undergraduate students. 53% of the respondents were of Information

Science concentration; 56% of the respondents graduated from ULV in the 2000-2004 periods; 64% of the respondents transferred to ULV from a junior college; 72% were male; 44% were of European American decent and 25% were Latino American; 47% have attended graduate school; 25% earned a masters degree; 53% pursued further education; and 75% are working in a related industry. Table 10 represents the details of the demographic data.

Table 10: Alumni Survey Results –Demographics		
Computer Science 2005 Alumni Survey Results – **Demographic Information**		
	n (n=36)	%
Campus		
Traditional Undergraduate	30	83
CAPA	6	17
Concentration		
A. Engineering	7	19
B. Software	9	25
C. Information Science	19	53
D. Blank	1	3
Graduation Year		
1985-1999	15	44
2000-2004	19	56
Came to ULV as		
Freshman	13	36
Transfer	23	64
Gender		
Male	26	72
Female	10	28
Ethnic Background		
European American	16	44
African American	5	14
Asian American/Pacific Islander	4	11
Latino American	9	25
Other	2	6
Attend Graduate School		
Yes	17	47
No	6	17
No Response	13	36
Highest Degree		
Bachelors	14	39
Masters	9	25
No Response	13	36
Pursue Further Education		
Yes	19	53
No	17	47
Working in a Related Job		
Yes	27	75
No	8	22
No Response	1	3

Students were asked several questions in relation to being prepared for graduate schools and careers. 83% of the respondents felt that ULV prepared them very well for graduate school. 91% of the respondents felt that they were equally prepared or better prepared than most students compared to peers from different universities. 93% of the respondents felt that they were prepared for their careers compared to peers from other universities. 67% of the respondents indicated that they would choose ULV if they were to go to college again. Table 11 represents detailed data from the survey.

Table 11: Alumni Survey Results – Career Preparation at ULV		
	N	%
How well ULV prepared you for graduate school		
Excellent	7	39
Good	8	44
Fair/Poor	3	17
Compared to peers how well were you prepared for graduate school		
Better Prepared Than Most	4	36
Equally Prepared	6	55
Unprepared Than Most	1	9
Compared to peers from other universities how well were you prepared for your career		
Better Prepared Than Most	12	41
Equally Prepared	15	52
Unprepared Than Most	2	7
If going to college again would you go to		
ULV	24	67
Another private college	4	11
State College	8	22

Students were asked about the specific learning outcomes of the program objectives. The majority of the respondents reported that they were satisfied with the acquisition of the basic concepts in software engineering and information technology. They were able to get jobs in industry related to their concentration or very close to. They learned the skills of analyzing problems before and during a project. They learned the skills of problem solving and research. They acquired project management skills. They had the basic concepts to be flexible and versatile to function in a variety of jobs. Finally, they leaned the skills of surviving under pressure and meeting deadlines in their jobs. Table 12 represents the frequency and percentage of the learning outcomes program objectives.

Table 12: Alumni Survey Results – Learning Outcomes Preparation		
	n	%
How well did ULV prepare you to:		
1. Acquire basic concepts in Software Engineering and Information Technology?		
Very Well	18	50
Somewhat Well	18	50
Not Well	0	0
2. Get jobs in industry related to your concentration?		
Very Well	12	33
Somewhat Well	23	64
Not Well	1	3
3. Analyze problems before and during a project?		
Very Well	12	34
Somewhat Well	22	63
Not Well	1	3
4. Research and problem solve independently?		
Very Well	18	51
Somewhat Well	16	46
Not Well	1	3
5. Manage projects (Time management and self-teach new applications)?		
Very Well	12	34
Somewhat Well	20	57
Not Well	3	9
6. Be flexible to function in a variety of jobs?		
Very Well	15	43
Somewhat Well	17	49
Not Well	3	9
7. Meet time demands of industry (meeting deadlines)?		
Very Well	15	43
Somewhat Well	19	54
Not Well	1	3

The third theme of the survey was about satisfaction with the Computer Science program. 66% of the respondents reported that they were satisfied with the existing technology in the program. 80% of the respondents felt that the supportive requirements in the program were important and they helped them in their studies. 76% of the respondents felt that the pre-requisite in the program were well organized. 91% of the students were satisfied with the theory presented in the major. Finally, 74% of the respondents were satisfied with the hands on labs in their major. Table 13 represents the frequency and percentage of the satisfaction with program theme of the survey.

Table 13: Alumni Survey Results – Satisfaction with Program		
	n(n=36)	%
1. Happy with existing technology in the program		
Yes	23	66
No	12	34
2. Supportive requirements helped you in your major		
Yes	28	80
No	7	20
3. Prerequisite courses helped you in your major		
Yes	25	76
No	8	24
4. Satisfied with the theory presented in your major		
Yes	31	91
No	3	9
5. Satisfied with the hands on labs in your major		
Yes	26	74
No	9	26

The fourth theme of the survey was about Learning Specific Outcomes Compared to Peers. The respondents felt equally prepared and better prepared compared to their peers in the following skills: Communications, computer, analytical, work environment, and sensitivity to cultural and environmental issues.

Only 24% of the respondents reported that they were less prepared to peers in the following areas: Skills of presentations to large groups, understand environmental issues, and community service. Table 14 provided the highlights of the survey

.

Table 14: Alumni Survey Results – Learning Specific Outcomes Compared to Peers						
	Better Prepared		Equally Prepared		Less Prepared	
	n(n=36)	%	n	%	n	%
Communications Skills						
Oral	8	24	21	62	2	6
Written	7	21	21	62	6	18
Electronic (email)	10	30	19	58	3	9
Presentations to large groups	11	33	14	42	8	24
Computer Skills						
Word Processing	8	24	25	74	1	3
Spread Sheet	10	29	20	58	4	12
Database	11	32	17	50	6	18
Internet	11	36	18	58	2	6
Analytical Skills						
Thinking Creatively	5	15	29	85	0	0
Reading Comprehension	6	18	26	79	1	3
Ability to link ideas to practice	9	27	24	71	1	3
Research (Ability to find info.	8	23	22	67	4	12
Quantitative reasoning	7	21	26	77	0	0
Qualitative reasoning	9	27	24	71	1	3
Work Environment						
Team Work	14	41	18	53	2	6
Leadership Skills	9	27	21	62	3	9
Benefiting from Feedback	7	21	24	71	3	9
Understanding Ethical Issues	10	30	20	61	3	9
Sensitivity to Cultural and Environmental Issues						
Aware Cult. Diversity Issues	11	33	16	49	6	18
Understand Environ. Issues	8	24	17	52	8	24
Community Service	8	24	17	52	8	24

3.2.2.4 Focus Groups

Two focus groups were conducted in December 2004. The focus groups were composed of traditional aged students as well as CAPA students. The focus groups identified the strengths, challenges, and opportunities of the program. Students were treated with pizza as an appreciation for their participation in the focus group and their cooperation. Each focus group took 2 hours.

Purpose: The goal of the focus group was to gather student feedback regarding the strengths, opportunities, and challenges of the Computer Science program at the University of La Verne (ULV) as part of a periodic overall program review process.

Participants: There were a total of 14 Computer Sciences students who volunteered to participate in 2 focus groups. The participants were 11 males and 3 females. Twelve of the participants were traditional undergraduate students and 2 were CAPA. Of the 14 participants 6 had Information Science concentration, 4 had Software concentration, 1 had Web Computing concentration, and 2 had engineering concentration. One student reported also being an E-Commerce major.

Procedure: Students were invited to participate in one of two focus groups that were offered during the week of December 6, 2004 at the ULV. Students were informed of these focus groups by their professors during their classes several weeks in advance, and they confirmed participation with their professors prior to attendance. They were informed that pizza and soft drinks would be provided during the focus groups.

The focus groups were conducted under the supervision of the Associate Dean of the College of Arts and Sciences at ULV, with 4 trained ULV doctoral psychology students serving as focus group leaders.

Each of the focus groups was structured in the same manner. Students were given a consent form to sign prior to participation (Appendix F), emphasizing that their responses will be kept confidential. Each focus group lasted for approximately one hour. Each focus group was moderated by one focus group leader. During the focus group student comments were put on a poster-board that could be viewed by the participants. As back up, student comments were also recorded by hand by one of the focus group leaders who did not actively participate in the process. The sessions were not tape-recorded.

Method: The following questions were used to guide the focus groups:

1. What are some of the strengths of this program as you have experienced it?
2. What do you think are some of the challenges this department has faced?
3. What opportunities does the Computer Science program provide?
4. What would you like to see done differently?

After the two focus groups were completed, the obtained information was subjected to a thematic content analysis to identify underlying themes.

Findings: Table 12 provides highlights of the findings. Records of actual student comments were not provided for confidentiality purposes.

A. *Advising:* Students were satisfied with advising. The advisors were reported to be supportive, helpful and available. The major challenge to advising was the limited number of advisors for so many students.

B. *Professors:* Personal relationships with professors and their availability were considered strengths: Students experienced them as helpful, and felt that they go above and beyond expectations to accommodate the students. The teaching methods of the professors were mostly hands-on, which represented one of the strengths of the program.

   Students appeared to be dissatisfied that one of the professors did not use the hands on approach and taught mostly based on theory rather than on application. They also felt that they had a homework overload from this professor. While this professor was knowledgeable, he/she was not willing to "talk to a person and have a conversation."

   Students expressed an interest in having an active role in the hiring process. One suggestion was to have the potential professor teach a class for the students. They also suggested that new professors should be hired for a semester rather than a year, and given an extended contract based upon positive student evaluations.

C. *Structure of Curriculum:* Students working in the industry felt that they were being taught the building blocks applicable in the industry. Other students would like the program to be more applicable to the "real world".

Challenges: Students expressed that the fixed schedule made it difficult to graduate on time if a class is failed or is not completed in the sequence of classes. The classes were difficult to incorporate into the CAPA students' cycle of classes. The students also felt that the required number of classes was excessive and they were finding it difficult to graduate in four years. They also felt that there were some unnecessary classes such as accounting and physics and that some classes were too basic. Due to the many changes in the program, the quality of some of the courses had decreased; one class specifically mentioned was the Networking class.

Suggestions: Students expressed the desire to be informed of changes to the program, specifically in regards to the possibility of a Comprehensive Exit Exam. If there was going to be an Exit Exam they would like a preparation/refresher course or a workshop. Students would also like more guidance with their senior project. They also suggested having more variety in programming languages as well as training for MCSE, CCNA, and a course in LINUX.

D. *Departmental Changes:* The students felt that the computer science program should be separated from math/physics and become a department. When discussing this issue, one student said that they wanted to have a separate identity. It was expressed that the resources were not going to the Computer Science department and that the Math department seemed to be a priority. The students felt that if the computer science program became an independent department it would improve. (Note: Students kept referring to the CS program as "department", and seemed to be of the impression that it was only recently that CS merged with math/physics.)

E. *Career Opportunities/Professional Development:* Students felt that the internship possibilities were communicated by email but were too restrictive to qualify for, and the locations were too far away. Students did not feel that they were encouraged to pursue graduate education, and wanted more help with career guidance and placement. Students expressed that the computer science program is known in different areas but is lacking in community networking for internships and job placements. Students would like to see certificate programs such as a CCNA certificate.

F. *Financial Resources:* The students expressed concern regarding financial assistance running out after four years of the program because of maxing out on their loans. Since many students were

taking more than four years to complete the degree, the students would like it to be considered a five-year program in order to receive financial assistance for their fifth year in the program. They felt that there were minimal opportunities to receive scholarships and that the GPA requirement was difficult to attain. Students also felt that they were being overcharged for lab fees.

G. *Facilities:* One group of students expressed complete satisfaction with the facilities whereas the other group felt the computer labs were outdated and did not function properly. The satisfied students felt that they were responded to when they needed assistance. The students who were dissatisfied felt that they were not getting the help and attention they needed in regards to the facilities. The students also felt that their space had been taken away from them and may no longer have a lounge.

H. *Environment:* Students expressed a general appreciation of the small intimate environment that the program provided: They were able to develop relationships with both professors and students.

Table 15 represents the summary of the focus group.

Table 15: Focus Group - Summary of Theme Highlights

Theme	Strengths	Challenges
A. Advising	Supportive, helpful, and available	Limited number of advisors
B. Professors	Personal relationships with students, availability, and support	One professor with more focus on theory than application
C. Structure of Curriculum	Working students feel they are being taught the building blocks	Overload of required, Fixed sequence of classes, Decrease in quality of some courses
D. Departmental Changes	N/A	Being merged with Math
E. Career Opportunities/ Professional Development	N/A	Restrictive internships. Lack of encouragement to pursue higher education. Career placement.
F. Financial Resources	N/A	No financial assistance after 4 years. Minimal scholarship opportunities. Lab Fees
G. Facilities	Some students felt that they were responded to in regards to work orders and requests	Non-functional computers
H. Environment	Small intimate environment	N/A

3.2.2.5 Curriculum Comparison

The Computer Science and Computer Engineering curriculum was compared with IS2002 Association for Computing Machinery (ACM) standard guideline.

The Model Curriculum and Guidelines for Undergraduate Degree Program in Information Systems (IS 2002) is the latest report on model curriculum work in information science. The previous report was presented in 1997. The first computer science / information systems curriculum effort took place in 1972 (ACM '72, Ashen Hurst, 1972) and then again in 1982 (ACM '82, Nona maker et al., 1982) by ACM. Other organizations, including Association for Information Systems (AIS), Association of Information Technology Professionals (AITP) and International Federation for Information Professionals (IFIP) had published model curricula. IS '97 was the first major collaboration of the three key organizations with a worldwide membership in information systems: ACM, AIS, and AITP. IS 2002 is the second collaborative effort between ACM, AIS, and AITP (IS2002 Update, Gorgone et al., 2002).

Purpose: The purpose of the curriculum comparison assessment was to ensure that the Computer Science and Computer Engineering curriculum had incorporated and integrated the IS2002 standard curriculum guidelines in the current curriculum. This exercise was a part of a periodic overall program review process.

Participants: The program chairperson analyzed, assessed, and generated this report to identify whether the current curriculum is compliant with IS2002 standard guidelines published by ACM.

Procedure: The chairperson studied and compared the information from IS2002 guidelines with the existing curriculum to generate the Comparison Report. IS2002 was selected because it was the most current curriculum standard guideline recommendation published in the field. Even though the program addressed Information Science concentration, the standard applied to Computer Science as well. No current computer science standard curriculum guideline document was found.

Method: This exercise consisted of two major comparisons. First, the program objectives were compared with the objectives presented in the IS2002 document. Second, the curriculum was compared with the recommended guideline presented in the IS2002 document.

Objectives: IS2002 identified characteristics evolve around four major areas of the profession and therefore recommended that they must be integrated into any curriculum:

1. IS professionals must have a broad business and real world perspective. Students must therefore understand that:
   - IS are enablers of successful performance in organizations
   - IS span and integrate all organizational levels and business functions
   - IS are increasingly of strategic significance because of the scope of the organizational systems involved and the role systems play in enabling organizational strategy
2. IS professionals must have strong analytical and critical thinking skills. Students must therefore:
   - Be problem solvers and critical thinkers
   - Use systems concepts for understanding and framing problems
   - Be capable of applying both traditional and new concepts and skills
   - Understand that a system consists of people, procedures, hardware, software, and data
3. IS professionals must exhibit strong ethical principles and have good interpersonal communication and team skills. Students must understand that:
   - IS require the application of professional codes of conduct
   - IS require collaboration as well as successful individual effort
   - IS design and management demand excellent communication skills (oral, written, and listening)
   - IS require persistence, curiosity, creativity, risk taking, and a tolerance of these abilities in others
4. IS professionals must design and implement information technology solutions that enhance organizational performance. Students must therefore:
   - Possess skills in understanding and modeling organizational processes and data, defining and implementing technical and process solutions, managing projects, and integrating systems
   - Be fluent in techniques for acquiring, converting, transmitting, and storing data and information
   - Focus on the application of information technology in helping individuals, groups, and organizations achieve their goals

The program chairperson created a matrix of the program objectives and the objectives presented in IS2002 document in order to graphically summarize and highlight the findings. Table 16 provides the findings.

Table16: Program Objectives and IS2002 Objectives				
Program Objective	***1. broad business & real world perspective***	***2. strong analytical and critical thinking skills***	***3. strong ethical principles & have good interpersonal communication and team skills***	***4. design and implement IT solutions that enhance organizational performance***
1: Basic Concepts Skills	X	X		X
2: Communication Skills		X	X	
3: Leadership and Collaboration Skills	X	X	X	X
4: Analysis Skills		X		X
5: Project Management Skills	X			X
6: Research and Problem Solving Skills		X	X	X
7: Graduate School preparation & Life Long Learning		X		
8: Time management Skills	X			X
9: Versatile			X	X
10: Prepare for Industry	X			X

Curriculum: The curriculum was compared with the recommended guideline presented in the IS2002 document. The Chairperson created a matrix of the curriculum and the IS2002 guidelines in order to graphically summarize and highlight the compliance of the guidelines. Table 17 provides the findings.

Table 17: Curriculum Comparison											
	1. IS 2002.PO - Personal Productivity with Info. System Technology	**2. 2002.1 - Fundamentals of Info. Systems**	**3. 2002.2 - Electronic Business Strategy, Architecture and Design**	**4. 2002.3 - Info. Systems Theory and Practice**	**5. 2002.4 - Info. Tech. Hardware and System Software**	**6. 2002.5 – Programming, Data, File and Object Structures**	**7. 2002.6 – Networks and Telecommunication**	**8. 2002.7 - Analysis and Logical Design**	**9. 2002.8 – Physical Design and Implementation with DBMS**	**10. 2002.9 – Physical Design & Implementation in Emerging Environment**	**11. 2002.10 – Project Management & Practice**
CMPS 100	X										
CMPS 110	X										
CMPN 150					X						
CMPN 202					X						
CMPN 220					X						
CMPN 279					X	X					
CMPS 280					X						
CMPS 300	X										
CMPS 301	X					X					
CMPS 318			X							X	
MATH 327				X							
CMPS 367						X					
CMPS 368							X				
CMPS 369							X				
CMPS 370			X							X	
CMPS 371						X					

CMPS 375								X			
CMPS 376						X					
CMPS 377						X					
CMPS 379						X					
CMPS 380						X					
CMPS 385						X					
CMPS 392											X
CMPS 400								X			
CMPS 410		X		X							
CMPS 451						X				X	
CMPS 454				X							
CMPS 455				X							
CMPS 460					X						
CMPS 463						X				X	
CMPS 465						X		X			
CMPS 471	X	X	X	X	X	X	X	X	X	X	X
CMPS 480			X			X	X	X			
CMPS 490									X		
CMPS 495								X	X	X	X
CMPS 499	X	X	X	X	X	X	X	X	X	X	X

Findings:

As table 16 and 17 indicated the Computer Science and Computer Engineering program had been following the standard guideline recommendation of IS2002 very closely. The program faces the challenge of keeping up to date with the emerging technologies as well as the introduction of the .NET environment.

3.2.2.6 Syllabus Review

The University of La Verne defined syllabus as: A Syllabus is an unambiguous detailed plan – a management and communication tool – that may be modified when so stated. A syllabus reflects University's standards and expectations. A syllabus projects instructor's professionalism organization and credibility. A syllabus contributes to the overall teaching evaluation process for promotion, and tenure. A syllabus establishes an agreement (Contract) that may be challenged in court. The quality assurance office at the University of La Verne devised a syllabus construction checklist that consisted of 16 elements that should be included in all syllabi of courses offered at the University of La Verne.

Purpose: The purpose of the syllabus review assessment was to ensure the quality assurance in the syllabi of the Computer Science program.

Participants: The 3 full time faculty members in the Computer Science program examined all syllabi in the program.

Procedure: The faculty members were given the University of La Verne's standard "Syllabus Construction Checklist" document as a rubric and asked to grade all of the syllabi in the program. Each faculty analyzed the syllabi independently. Later, they met to discuss any discrepancy.

Method: The Syllabus Construction Checklist was used as a rubric in the syllabus review assessment. The following elements were used to guide the assessment:

1. Identification: Centered at the top of the first page of the syllabus; identifies the University, program, campus/site and semester.
2. Information about the course: Includes department prefix, number, title, semester hours, pre-requisites, and identifies program relation – elective, required GE, etc.
3. Information about instructor: Name, degree, rank, office hours and/or contact information by phone, e-mail, etc.
4. Course description: Briefly describes the general **goals** of the course in a way that is a little more than what is in the catalog but is consistent with the original course outline (proposal) (may use bullet format), and identifies which of the following University Mission elements are salient in the course: Diversity and Intercultural Orientation, Values Orientation, Interdisciplinary Thinking, Service Orientation and Life Long Learning.

5. Objectives: Identifies in bullets the specific learning outcomes in terms of knowledge, skills and competencies – may be narrative in form.
6. Nature of activities in the class: Reflects and is consistent with objectives – such as specific types of writing, group projects, content of lectures, nature of presentations, computer-simulations and reflections about films, etc.
7. Texts and readings: Describes in a complete professional format (MLA, APA, etc.) required and optional readings and materials.
8. Weekly (or daily) plan: Includes dates, topics, assignments, tests and exams – just giving chapter numbers is not adequate.
9. Evaluation and Grading: Explicitly reflects objectives, clearly describes how grade is obtained, identifies points or weights given to each evaluation activity, and explains "Incomplete" or "In Progress" policy.
10. Plagiarism policy: Refers to the ULV policy in the catalog, and establishes the policy involving potential consequences.
11. Attendance policy: Describes instructor expectations related to grade, approved absences, and excessive absences.
12. Class Participation: Describes instructor expectations related to what constitutes "participation" and how it affects grade.
13. Group Assignments: If this is involved, describes instructor expectations, the nature of the tasks and how each individual's contribution will be evaluated.
14. Make-up and late assignments: Describes if late assignments are acceptable, whether make-ups are provided and how grades will be affected.
15. Writing assignments: If this involved, describes nature and length of assignments, deadlines, submission of draft or portions for feedback, criteria and rubric to be used for evaluation (suggestions provided by Writing Excellence Committee – see web site), electronic or hard copy submissions
16. Tests and exams: Describes specific dates, nature (essay, multiple-choice), coverage of topics or material, evaluation points associated with the test, make-up policy consequences if any.

The Computer Science faculty reviewed the syllabi for each of the courses in the Computer Science and Computer Engineering major. They analyzed the content with respect to the 16 elements in the checklist and identified the deficiencies. They created a matrix that included the courses in the program and the 16 elements of the checklist. They used the following grades to fill out the matrix. 3= excellent; which meant that the item was very clearly mentioned in the syllabus, 2= fair; which meant that the item was mentioned indirectly, 1= poor; which meant that the item was barely mentioned and it needs improvement. Table 18 reflects the results of this exercise.

Table 18: Syllabus Review Checklist																
	1. Identification	**2. Info. about course**	**3. Info. about Instructor**	**4. Course Description**	**5. Objective**	**6. Activities**	**7. Text and Reading**	**8. Weekly Plan**	**9. Evaluation & Grading**	**10. Plagiarism Policy**	**11. Attendance Policy**	**12. Class Participation**	**13. Group Assignment**	**14. Make up & Late assign.**	**15. Writing Assignment**	**16. Tests and Exams**
CMPS 100	3	3	3	3	1	3	3	3	2	1	1	1	1	1	3	3
CMPS 110	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPN 150	3	3	2	3	1	1	3	3	2	1	1	1	1	1	1	3
CMPN 202	3	3	2	3	1	1	3	3	2	1	1	1	1	1	1	3
CMPN 220	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPN 279	3	3	3	3	1	2	3	3	3	3	3	2	1	3	3	1
CMPS 280	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 300	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 301	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 318	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
MATH 327	3	3	3	3	1	3	3	1	3	3	3	1	1	3	1	3
CMPS 367	3	3	3	3	1	3	3	3	3	3	3	1	1	1	1	3
CMPS 368	3	3	1	3	1	3	3	3	3	1	3	3	1	3	3	3
CMPS 369	3	3	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CMPS 370	3	3	3	3	1	3	3	3	3	1	3	3	1	1	3	3
CMPS 371	3	3	3	3	1	3	3	3	3	3	3	1	1	3	1	3
CMPS 375	3	3	3	3	1	3	3	3	3	1	3	3	3	3	3	3

CMPS 376	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 377	3	3	3	1	1	3	3	1	3	3	3	1	3	1	1	3
CMPS 379	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 380	3	3	3	3	1	1	3	3	3	1	1	3	1	1	1	3
CMPS 385	3	3	3	3	1	3	3	3	3	3	3	1	1	3	1	3
CMPS 392	3	3	3	3	3	3	3	3	3	3	3	1	3	3	3	3
CMPS 400	3	3	3	3	1	1	3	1	3	3	3	1	1	3	1	3
CMPS 410	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 451	3	3	3	3	1	3	3	3	1	3	3	1	1	3	1	3
CMPS 454	3	3	3	3	1	3	3	3	1	3	3	1	1	3	1	3
CMPS 455	3	3	3	3	1	3	3	3	1	3	3	1	1	3	1	3
CMPS 460	3	3	3	3	1	3	3	3	1	3	3	1	1	3	1	3
CMPS 463	3	3	3	3	1	3	3	3	1	3	3	1	1	3	1	3
CMPS 465	3	3	3	3	1	3	3	3	1	3	3	1	1	3	1	3
CMPS 471	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 480	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 490	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 495	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CMPS 499	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3

- 3= excellent; 2= fair; 1= poor.

Findings: Most of the syllabi in the Computer Science and Computer Engineering program followed the majority of the 16 point standard rubric. The syllabi assessment identified that most of the course syllabi in the Computer Science program did not include element 5 of the rubric Objectives which identifies the specific learning outcomes in terms of knowledge, skills, and competencies. This issue will be addressed in the future action plan of modification.

3.2.2.7 SWOT Analysis

The SWOT analysis of the Computer Science program was prepared by: Dr. Aghop Der-Karabetian. Twenty stakeholders were identified in Fall 2005. Interviews were conducted in January 2005. The section below reflects the summary of the strengths, weaknesses, opportunities, and threats of the program.

Summary of Strengths

1. Faculty

- Faculty is very dedicated, passionate and supportive of students, personally and professionally
- Faculty helps build a good community with a personal touch
- Faculty is available for advising and assists well with senior projects
- Program chair communicates well with students
- Faculty members keep up to date with developments in the field

2. Program and Curriculum

- Program follows ACM (Association of Computer Machinery) guidelines
- Preparatory and pre-req courses are generally adequate
- Major prepares students for graduate school
- Program is current and is good in updating languages
- Internship in the industry is required
- Students are required to work for OIT and IT while at ULV on Work Study funds, which provides valuable learning experience
- Senior Projects are unique to ULV and are of high quality, reflecting student learning
- The Information Systems part of the program is good
- Student ethnic diversity in the program is good

3. Resources

- Lab and program resources are generally adequate for IT
- NSF Scholarship Fund supports students
- Lab fee is helpful-more of it could be utilized

Summary of Weaknesses and Challenges

1. Faculty

- There are not enough full-time faculty members for the number of students
- There are no faculty members with Ph.D.'s in computer science
- There is lack of research activity by faculty
- Faculty are not getting credit for Labs
- Program chair is overburdened and frustrated with lack of resources
- Communication between program and department chair not optimum-distance is a partial problem
- Part-time faculty maybe good in industry but may not teach well

- There is no strong vision and creativity among faculty to take program to next level

2. Program and curriculum

- The program is not equipped for the engineering concentration-hardware and software
- Distinctions between different concentrations is not perceived clearly
- There are too many courses in the major
- Students are concerned about finishing in four years, and turn away from the major
- Pre-requisite and support courses are not enforced adequately
- Curriculum is not current with the changes in the field and the job opportunities
- Program not competitive with other programs in the area-technology and focus
- Senior projects take long time to finish
- The math requirement is discouraging in E-commerce
- Financial accountability for cross listed courses is not clear

Summary of Opportunities

1. Curriculum

- Emphasize the Web Computing concentration more
- Provide certificate programs in specialized areas
- Develop concentrations in Data base management, network security, data warehousing and data mining, remote access/wireless computing, and supply chain management
- Develop multidisciplinary concentrations in graphic design, animation, and digital technologies
- Drop the Computer Engineering concentration
- Offer more hybrid courses
- Focus curriculum on "Front end" skills, such as webpage, visual basic, Java, C++, etc

2. Organization

- Consider becoming a separate department
- Go for accreditation when ready
- Consider changing the name of the program from "Computer Science" (Obsolete name) to one that reflects current field, e.g.: " Computer Information Technology" or "Information Science"
- Change the IT work experience into internship, and enhance industry based internships
- Create a job placement program
- Rethink scheduling
- Take advantage of CS faculty in the College of Business

3.2.3 Periodic Assessments

In addition, the program had implemented some periodic assessments to measure the progress against its objectives. The program used the results of the assessments with the intention to identify program improvements and to modify the program's objectives. The Periodic Assessments included: Meyers Briggs, Pre-Post test, Comprehensive exam, Senior Project presentation evaluation, and Senior Project document evaluation based on a rubric.

3.2.3.1 Myers-Briggs

The Program chairperson selected Myers-Briggs Type Indicator test because of its availability and accessibility on campus. Myers-Briggs Type Indicator (MBIT) was considered one of the most popular personality tests available in industry. MBIT assessed individuals' tendencies in four categories: Introversion or Extroversion, Intuition or Sensing, Thinking or Feeling, and Judging or Perceiving. Myers-Briggs assumed that the person to be in either one thing or another. But personality did not fit into binary categories. The person fell somewhere along a continuum. Myers-Briggs also assumed that the person was consistent and that the person had a consistent pattern of behavior. But that pattern was complex, and the individual's personality was contingent; it represented an interaction between his/her internal disposition and the situations that he/she faced.

Purpose: The purpose of conducting Myers-Briggs Type Indicator (MBIT) was of two folds: First, to identify which personalities have the tendency to major in Computer Science. Second, the test was conducted to identify which personalities have the tendency to enroll in online courses and succeed. This is a research in progress conducted by the Chairperson of the program.

Participants: 31 Students who were enrolled in CMPS 410: Management Information Systems course participated in this assessment.

Procedure: Students enrolled in CMPS 410: Management Information Systems in Fall 2004 and Spring 2005 were invited to volunteer for this study. The volunteers took this test after taking their midterm exams. The tests were tabulated by the office of the career center. Later, a representative from the career center presented and interpreted the results to the students.

Method: After the results were distributed, presented, and interpreted to the students, the program chairperson kept a record of the students'

scores. Later, the accumulated records were subjected to a thematic content analysis to identify underlying patterns.

Findings: Thirty-one students took the Myers Briggs test. Fifteen students took the test in Fall 2004 and 16 students took the test in Spring 2005. Table 19 reflects the frequency of the results. 49% of the students who signed up for CMPS 410: Management Information Systems course fell in the category of ESTJ.

Table 19: Myers Briggs Test

		FALL 04	%	SPRING 05	%	Total	%
1	ENFJ	1	7%	2	13%	3	10%
2	ENTJ	1	7%	0	0%	1	3%
3	ESTJ	8	53%	7	44%	15	49%
4	ESTP	1	7%	1	6%	2	6%
5	ESFJ	0	0%	1	6%	1	3%
6	INFJ	0	0%	1	6%	1	3%
7	ISFP	0	0%	1	6%	1	3%
8	ISFJ	2	13%	0	0%	2	6%
9	ISTJ	2	13%	3	19%	5	17%
	Total	15	100%	16	100%	31	100%

As mentioned, this is research in progress. The chairperson hoped to accumulate more data before generalizing the study and presenting the study results at academic conferences.

3.2.3.2 Senior Comprehensive Exam

The senior comprehensive exam was implemented as graduation requirements in fall 2002. Therefore, spring 2005 was the first semester the exam was proctored. The topics of the exam consist of all the core courses the students took during their 4 year period.

Purpose: The purpose of the Comprehensive exit exam assessment was to ensure that the Computer Science and Computer Engineering students had acquired the basic concepts in software, engineering, and information science. This exercise is a part of a periodic overall program review process.

Participants: Two faculty members wrote the questions of the exam and a total of 8 students participated in taking the exam.

Procedure: The committee met and reviewed the exam questions. On May 18, 2005, senior students who started ULV in fall 2002 took the exam. The exam lasted 3 hours.

Method: The Comprehensive exam covered 5 of the core courses in the major. The courses include: Programming, Computer Organization, Compiler Design, Discrete Mathematics, and Database Management Systems. The exam consisted of 18 questions. See Appendix G for a copy of the exam.

Findings: A total of 8 students took the exam. Two students graduated in May 2005. Two students were early seniors who planed on graduating in winter 2006. One senior was a transfer student from Cal Poly Pomona and 3 students were juniors who did not complete all the coursework. The detail analysis of the exam was presented in table 20. The table presented the following observation:

All senior students scored over 60% of the exam. The majority of the students were able to answer the questions in CMPS 367: Programming languages as well as CMPN 280: Computer Organization subjects.

All of the students except for one were unable to answer the two questions in MATH 327: Discrete Mathematics subject. One student was able to answer only one of the questions.

Most of the students were unable to answer all of the questions in CMPS 455: Compiler Design course which is an upper division specific course for Software concentrations. Moreover, only one

student was able to answer all of the questions in CMPS 490: Database Management Systems course.

Table 20: Comprehensive Exam						
Std #	**CMPS 367 7 Qst.**	**CMPN 280 2 Qst.**	**CMPS 455 3 Qst.**	**MATH 327 2 Qst.**	**CMPS 490 4 Qst.**	**Total**
1	2/7	2/2	0/3	0/2	1/4	5/18
2	7/7	2/2	NT	0/2	2/4	11/18
3	5/7	2/2	NT	0/2	3/4	10/18
4	2/7	0/2	1/3	NT	2/4	5/18
5	6/7	2/2	2/3	0/2	2/4	12/18
6	6/7	NT	1/3	1/2	1/4	9/18
7	6/7	2/2	1/3	0/2	4/4	13/18
8	3/7	1 /2	2/3	NT	0/4	6/18

- (NT= Subject Not Taken by the student)

3.2.3.3 Senior Project Presentation Evaluation

All students who finished their senior project had to present it in front of their peers as well as faculty members. The faculty and the audience filled out a presentation evaluation form. Those surveys had been accumulated for the first time in fall 2004. This is a periodical assessment.

Purpose: The purpose of the senior project assessment was ensuring the achievement of the implementation of the program objectives in the curriculum. The findings of this exercise identified the strengths, opportunities, and challenges of the Computer Science program at the University of La Verne as part of a periodic overall program review process.

Participants: Twelve students presented their senior projects in December 2004. Five students were CAPA students and 7 students traditional undergraduate. Therefore, this assessment included all 12 students. There were 3 female and 9 male students who participated in this assessment.

Procedure: Computer Science students usually sign up for their senior project as the last course in their major. At the end of the semester if the student could not finish his/her project, the faculty member will grant an "In Progress" (IP) grade. The student had 1 year to complete his/her senior project once the IP grade was granted.

The Computer Science and Computer Engineering program started organizing semi-annual senior project presentations since 2003. The first event was in December and the second in May. An announcement was sent to all students via e-mail inviting them to come forward if they were ready to present. The schedule with the abstracts of the senior project presentations were accumulated and organized. A second e-mail was mailed to all executive management as well as all the students inviting them to attend the event. The time schedule and the abstracts of the senior projects presentations were attached to the last e-mail. (See Appendix H for a sample of the program with abstracts).

Senior Project Presentation Evaluation forms were distributed to all attendees (See Appendix I for a sample of the presentation evaluation form). The faculty members including the audience evaluated each presenter at the end of the presentation.

Method: The senior project evaluation forms were analyzed in detail. The committee identified the strength of the presenters. Moreover, they identified the challenges to be addressed by integrating them in the curriculum.

The senior project presentation evaluation consisted of a 5 point Likert scale questions. The evaluation consisted of 15 questions. The questions included: Introduction (self introduction and source of the idea), the abstract, purpose statement of the project or research question, research and reference literature review about project, conceptualization and rationale of the project, description of the method and procedures used, presentation of system analysis and design, project demonstration, discussion and implication of the project, organization of the presentation (notes, sequence, pacing), relation to audience (quality of the spoken voice, eye contact), professional quality of audio visual material, response to questions, and professional attire. The survey ended up with an "Additional Comment" open ended question.

Findings: The data from the evaluation was aggregated for analysis. Table 21 provided the findings.

Table 21 Senior Project Presentation Evaluation

STD #	Introduction	Abstract	Purpose	Research/Reference	Concept. & Rationale	Methods/Procedures	Analysis and Design	Demonstration	Discussion	Organization	Relation to Audience	Audio Visual	Questions	Attire	Total
1	3.75	3.58	3.33	3.6	3.55	3.75	3.33	3.82	3.58	3.83	3.82	3.55	3.9	3.73	**51.1**
2	3.17	2.5	2.67	2.17	2.33	2.33	1.83	2.17	2.33	1.86	2.14	2.29	2.3	2	**32.12**
3	3.91	3.91	3.91	3.45	3.73	3.73	3.82	3.55	3.73	3.64	3.73	3.73	3.7	3.91	**52.48**
4	3.8	3.93	3.86	3.4	3.67	3.53	3.67	3.62	3.6	3.67	3.73	3.8	4	4	**52.28**
5	3.67	3.73	3.73	3.73	3.87	3.73	3.8	3.61	3.8	3.93	3.6	3.8	3.9	3.86	**52.76**
6	3.86	3.82	3.91	3.71	3.86	3.82	3.82	3.91	3.86	3.91	3.91	4	3.9	4	**54.29**
7	3.41	3.59	3.59	3.31	3.53	3.29	3.24	3.38	3.31	3.13	3.31	3.5	3.6	4	**48.22**
8	3.71	3.57	3.64	3.43	3.64	3.29	3.25	3.5	3.36	3.07	3.14	3.26	3.6	3.92	**48.42**
9	3.88	3.82	3.88	3.76	4	3.71	3.81	3.71	3.94	3.82	3.94	3.88	3.9	4	**54.03**
10	4	3.83	3.83	3.7	3.82	3.64	3.67	3.63	3.83	3.67	3.73	3.67	3.8	3.58	**52.35**
11	3.42	3.67	3.75	3.7	3.75	3.55	3.33	2.57	3.2	3.25	3.08	3.45	3.4	3.91	**48.03**
12	3.83	3.83	3.78	3.47	3.89	4	3.78	3.89	3.89	3.72	3.72	3.89	3.9	4	**53.57**
Total:	**3.7**	**3.65**	**3.66**	**3.45**	**3.64**	**3.53**	**3.45**	**3.45**	**3.54**	**3.46**	**3.49**	**3.57**	**3.7**	**3.74**	

Out of the twelve students, one student seemed to have an average of 2 points and above. The majority of the points were above 3.5 points which indicated that Computer Science students seemed to master the skills the program hoped they learn. No challenges were highlighted.

Table 22 reflects the summary of the Senior Project Evaluations for December 2004. Except for student number 2, students' overall average scores ranged from 3.43 – 3.88. This indicated that students had leaned the skills needed to succeed in industry.

Table 22: Summary of Senior Project Evaluations

Student #	Overall Average	*N*
1	3.65	12
2	2.29	7
3	3.75	11
4	3.73	15
5	3.77	15
6	3.88	22
7	3.44	17
8	3.46	14
9	3.86	17
10	3.74	12
11	3.43	12
12	3.83	18

3.2.3.4 Senior Project Document Evaluation

The Computer Science and Computer Engineering program had been accumulating the documentation of all senior projects presented to the program.

Purpose: The purpose of the Senior Project Document Evaluation was to ensure the achievement of the integration of the program objectives in the curriculum. The findings of this exercise identified the strength, opportunities, and challenges of the Computer Science program at the University of La Verne as part of the periodic overall program review process.

Participants: The program chairperson and an outside consultant.

Procedure: An outside consultant analyzed and assessed the entire senior project documents presented in Fall 2004. There were 14 students who presented their senior projects in December 2004. (See Appendix H for a sample of the students' schedule and Abstracts)

Method: The consultant followed the Senior Project Rubric/Rating Scale to analyze the 14 senior projects presented in December 2004. The rubric consisted of 4 type Likert scale and it had 23 questions. The questions were grouped into 5 themes that include: Integration and Inference, Reference list, Organization, Language use, and Academic integrity. The questions include:

1. Has clear and well-defined thesis
2. Recognizes the complexity of the factors involved
3. Uses scholarly sources and appropriate research methodology
4. Thoroughly analyzes, evaluates and integrates information
5. Concludes and infers appropriately
6. Majority of sources are current (appropriately current)
7. Sources are from refereed journals or scholarly books and exceptions are appropriate
8. Formatting is consistent with appropriate academic style (e.g.APA, MLA)
9. Total number of references is reasonable (not too few or not too many)
10. Reference list matches with citations
11. Is well-organized (good headings/paragraph breaks)
12. Main ideas are clear and vivid
13. Sequencing is smooth and effective
14. Project overall is clean and presentable
15. Displays consistent facility with language
16. Uses variety of sentence structures from simple to complex
17. Word choices are sophisticated, precise, original
18. Uses idioms appropriately

19. There are no detectable grammatical or mechanical errors
20. Citations/footnotes are placed appropriately
21. Quotation marks are placed where necessary
22. Paraphrasing is well done and cited
23. No glaring shift of style/vocabulary indication plagiarism

The following rating scale was used for the assessment:
1= Excellent (Demonstrates skill or property to a very high degree)
2= Good (Demonstrates skill or property to a high degree with minor or occasional shortcomings)
3= Fair (Demonstrates skill or property at a minimally acceptable level with some serious shortcomings)
4= Poor (Demonstrates skill or property at less than acceptable level with serious shortcomings). (See Appendix J for the rubric form).

Findings:
A total of 14 senior project documents were analyzed and assessed based on the rubric (See Appendix K for original report). In general the program has been following a solid rubric. Most of the students followed the rubric very closely. Including the PowerPoint presentation slides as well as snapshots of the final outcome was recommended for future improvement. The section below presents the detail explanation of the report.

Integration and Inference

Has clear and well defined thesis: Almost all of the students were able to clearly state the purpose and the thesis for their projects. Most were done in the context, and for the organizations, for which they were interning during the creation of the project.

Recognizes the complexity of the factors involved: As expected, the complexity of the projects proved to be the most difficult area for these undergrad students to fully comprehend before they started the projects. Although they did not all include observations during or at the completion of their projects, in the final report, those that did each said that they wish they had put more time into planning and research on how they were going to approach the problem chosen by them. Keeping journals and making progress reports should be encouraged and possibly required for each project.

Uses scholarly sources and appropriate research methodology: Those that did research before attempting to complete their projects, for the most part, chose appropriate sources. Many that just cited their text books, and how-to-texts on some application or programming language.

Thoroughly analyzes, evaluates and integrates information. Concludes and infers appropriately: The students did well in both of these areas. Once they got started on their projects they were capable of completing them and reporting on their success.

Reference List

Majority of sources are current (appropriately current). Sources are from refereed journals or scholarly books and exceptions are appropriate: For the few projects that actually were based on solid research the list was well targeted to the project design and implementation. In most cases, where sources were cited they seemed appropriate. Low marks for these two items were mostly from a lack of references, not for low caliber ones actually used.

Formatting is consistent with appropriate academic style: Footnoting, when used, for the most part was clear and done appropriately.

Total number of references is reasonable. Reference list matches citations: When references were given, and cited, they were adequate.

Organization

Is well-organized. Main ideas are clear and vivid: The organization of the projects, although widely different, was for the most part fine.

Sequencing is smooth and effective. Project overall is clean and presentable: Each was nicely done and very presentable. Only one of the fourteen was not bound.

Language Use

Displays consistent facility with language. Uses variety of sentence structures from simple to complex. Word choices are sophisticated, precise, original. Uses idioms appropriately. There are no detectable grammatical or mechanical errors: For the most part the projects were well communicated. A few typographical errors, remnants or leftover artifacts of cut-and-paste editing, were the most prevalent error where any existed. Some grammatical errors seemed to be caused by "English as a second language" student's backgrounds.

Academic Integrity

Citations/footnotes are placed appropriately. Quotation marks are placed where necessary. Paraphrasing is well done and cited: Low marks in this area were from lack of references, rather than the quality of how they were presented.

No glaring shift of style/vocabulary indication(sic) plagiarism: This was not an issue with these fourteen projects.

In conclusion: A number of the projects resulted in Internet Web based applications, yet there were very few graphical illustrations of the finished product. The Web is a graphical environment; it would seem prudent to reproduce within the report what the end product of the project looks like in a browser. Just listing the HTML or PHP code seems inadequate.

There was in some cases a blurring of the content of the Introduction. More than likely there should be a Personal Background section that is distinct from the Project Introduction. Including listings of the code written by the student for computer science projects is not only useful, but probably necessary to document their work.

4. Students Support and Process

This section covered the student course evaluation and student academic advising.

4.1 Student Course Evaluation

Purpose: The purpose of the students' course evaluation assessment was to ensure the satisfaction of the students with the program. The findings of this exercise identified the strengths, opportunities, and challenges of the Computer Science program at the University of La Verne as part of a periodic overall program review process.

Procedure: This document was prepared by Associate Dean, Dr. Aghop Der-Karabetian. All course evaluations in Computer Science program that were offered in Spring 2004 were aggregated and analyzed. The section below reflected the tables of the summary followed by concluding remarks made by the Associate Dean.

Table 23: Percentage of positive and negative themes in the evaluations **of courses in the Computer Science program at the University of La Verne.**

	Total	
	n	**%**
Negative	144	29
Positive	361	71
Total	**505**	**100**

Note:

- Overall about one-third of the comments are negative and two-thirds are positive.

***Table 24: Percentage of positive themes related to personal teacher characteristics in* the evaluations of courses in the Computer Science program at the University of La Verne.**

	Total n	Total %	% of Grand Total
1. Caring, positive nurturing, understanding	48	32	13
2. Enthusiastic, motivating	13	9	10
3. Knowledgeable, professional, well prepared, high standards	46	30	3
4. Good communication skills	44	29	9
Total	**151**	**100**	**30**

Note:

- The most common positive faculty characteristics are "caring" and "knowledgeable, professional."

Table 25: Percentage of positive themes related to course structure & presentation **in the evaluations of courses in the Computer Science program at the University of La Verne.**

	Total n	%	% of Grand Total
1. Helpful assignments	**19**	**13**	**4**
2. Well Organized	**23**	**16**	**5**
3. Interesting subject matter	**16**	**11**	**3**
4. Student and class involvement	**9**	**6**	**1**
5. Effective resources	**13**	**9**	**2**
6. Relevant or applied material	**5**	**3**	**1**
7. Productive- learned content	**25**	**17**	**3**
8. Productive-learned skills	**26**	**18**	**4**
9. Effective use of groups	**3**	**2**	**1**
10. Relaxed atmosphere	**5**	**3**	**1**
Total	**144**	**98**	**25**

Note:

- Overall most positive course characteristic is "well organized", followed by "helpful assignments" and "productive-learned specific skills."

***Table 26: Percentage of negative themes related to personal teacher characteristics* in the evaluations of courses in the Computer Science program at the University of La Verne.**

	Total		% of Grand
	N	%	Total
1. Uncaring, critical unapproachable, biased	**4**	**44**	**1**
2. Lack of enthusiasm	**0**	**0**	**0**
3. Lack of knowledge and/or preparation	**3**	**33**	**1**
4. Poor communication skills- monotone, unclear speaking or unintelligible writing on the board	**2**	**22**	**0**
Total	**9**	**100**	**2**

Note:

- The most common negative faculty characteristics are "uncaring" and "lack of knowledge."

Table 27: Percentage of negative themes related to course structure **and presentation in the evaluations of courses in the Computer Science program at the University of La Verne.**

	Total n	%	% of Grand Total
1. Inappropriate or unhelpful assignments	**2**	**2**	**0**
2. Poorly organized	**22**	**22**	**4**
3. Subject matter not interesting	**9**	**9**	**2**
4. Lack of student involvement	**4**	**4**	**1**
5. Poor resources-dull or inappropriate audiovisuals, speakers	**13**	**13**	**3**
6. Overly rigorous work load or harsh grading, too much material, too fast a pace	**29**	**28**	**6**
7. Limited presentation,wish for additional topics or topics covered in more depth	**23**	**23**	**5**
Total	**102**	**101**	**21**

Note:

- The most frequently reported negative course characteristic is "overly rigorous work load", followed by "limited presentation" and "poorly organized."

***Table 28: Percentage of negative themes related to environmental* and student factors in the evaluations of courses in the Computer Science program at the University of La Verne.**

	Total n	%	% of Grand Total
1. Poor facilities	**10**	**38**	**2**
2. Other students	**2**	**8**	**0**
3. Time slot too lengthy	**11**	**42**	**2**
4. Time slot too short	**0**	**0**	**0**
5. Inconvenient class time	**2**	**8**	**0**
6. Lack or readiness for the course	**1**	**4**	**0**
7. Couldn't afford the materials	**0**	**0**	**0**
Total	**26**	**100**	**4**

Note:

- The most reported negative environmental or student factor is "poor facilities" followed by "time slot too lengthy."

Table 29: Percentage of positive and negative general themes
in the evaluations of courses in the Computer Science program at the University of La Verne.

	Total N	%	% of Grand Total
Positive	**66**	**90**	**13**
Negative	**7**	**10**	**1**
Total	**73**	**100**	**14**

Notes:

- Overall, 90% of the general comments made were positive.
- General comments make up approximately 14% of the data.

4.2 Student Academic Advising

Until May 2004 the Computer Science and Computer Engineering program had two full time faculty members and four part time faculty members. The full time faculty members were responsible for doing the academic advising in addition to their teaching load. The table below reflected the number of students and the Academic Advising load of each of the faculty members for Fall 2004 – Spring 2005.

Table 30: Academic Advising		
	Semester	
Faculty Members	**Fall 2004**	***Spring 2005***
1. Ahmadnia	30	27
2. Whitby	122	106
Total:	152	133

In September 2005 a third faculty member was added to the program. No students were assigned to him for academic advising to keep the continuity with the students since new faculty member was a one year non-tenure track appointment.

Students usually meet with their academic advisors officially 4 times a year. The faculty members ensure the meetings with the students at least 2 times a year during registration because they had to pick up their Advisor code. Each academic advising appointment normally takes around 30 minutes because the faculty member takes the time to get to know the student and talk about personal growth as well as future goals.

5. Faculty

The Computer Science program included two full time faculty members and four part time faculty members until May 2004. In September 2004 the program had an additional full time faculty member. The new position was a non tenure track one year position. The Computer Science program is one of the three programs which collectively comprise the Mathematics/Physics/Computer Science department.

5.1 Faculty Qualifications

Professor Ray Ahmadnia had two Masters' degrees - M.S., Applied Mathematics, University of Nebraska-Lincoln in 1982; and M.A., Mathematics from Eastern New Mexico University in 1976. His B.S. was in Mathematics from National University of Iran in 1971.

Professor Ahmadnia started teaching for the University of La Verne as a Part Time faculty 1985-1997. In 1998 he joined the Computer Science program as a full time faculty member.

Professor Ahmadnia's normal teaching load is 6 courses per academic year. Due to the program needs Professor Ahmadnia teaches 4-5 courses per semester.

Dr. Seta Whitby earned her **Ed.D.** degree in Organizational Leadership from the University of La Verne in 2003. She completed all coursework for **Ph.D.** in Management of Information Systems from the Claremont Graduate University in 1999. She earned two Masters degrees -- **M.S.** in Management Information Systems from Claremont Graduate University in 1995, and **M.Ed.** in Computer Education from the University of La Verne in 1988. She earned her **B.S**. in Computer Science and Computer Engineering from the University of La Verne in 1985.

Dr. Whitby started teaching for the University of La Verne since 1984. In addition to her normal teaching load, she frequently teaches overloads to fill the need of the program. (See Appendix L for Facutly Vitae).

Dr. Philip Tai, Ph.D. taught for the University of La Verne in Fall 2004-Spring 2005 fiscal year. His contract was one year temporary assignment.

Faculty Interest, Size, Publications

The faculty members in the Computer Science and Computer Engineering program dedicated and devoted all their energy in fulfilling the need of the program.

The faculty / student ratio in the Computer Science program was overwhelming. A resource to have extra faculty member in the program was a must for the survival of the program.

One of the faculty members started publishing since she earned her Ed.D. Her interest is in Distance Education. Since 2003 she started presenting at various academic conferences and in the process of publishing in peered reviewed journals.

In September 2005 the program hoped to hire a third Tenure Track Full Time faculty member.

5.2 Part Time Procedures

The Computer Science and Computer Engineering program followed the standard University of La Verne procedures for hiring the Part Time faculty members. The program had one Senior Adjunct faculty, and two Adjunct faculty members.

All Part Time Faculty members in the program earned their Ph.D. or D.PA degrees. The part time faculty members came to campus once a week from 6:00 – 10:00PM.

6. Technology Infrastructure & Computing Facilities

The Computer Science and Computer Engineering program is located in Leo Hall building. The building address is 2170 D street.

In addition to the three full time faculty offices, the program has one major computer lab in Room Leo Hall 130. There are 25 computers in the lab. In addition, Leo Hall Room 112 is considered as the hardware and network lab. There are 12 computers as well.

The computers were upgraded every 3 years. In Fall 2005 all computers in room 130 were upgraded. The Office of Information Technology is responsible of maintaining the hardware as well as the software in all labs.

Computing infrastructure consists of hardware, software, and technical support. Because of the need to keep abreast of the rapidly changing technology environment, Information Systems students and faculty must have access to computing facilities at least equivalent to those used in industry. This is necessary to prepare the students for their profession and for the faculty to contribute to the creation of new knowledge in the field. The rate of change in technology suggests a rapid replacement cycle, with some technologies reaching obsolescence in less than 12 months. While some of the general university or school computing laboratories may meet some of the needs of Computer Science, special infrastructure resources are necessary to support the requirements of the curriculum, including systems development, network infrastructure, and other advanced and emerging technologies. In addition to software and hardware, it is paramount to the success of the program that adequate technical support is provided.

7. Institutional support / Financial Resources

7.1 Personnel Support:

Since May 2004 the program struggled by operating without a full time Administrative Assistant. In October 2004, the program hired a full time Administrative assistant. Unfortunately, the program lost the assistant help to a higher paying job. Since then the program was provided with a part time Administrative assistant who is allowed to work only 20 hours a week.

7.2 Library Collection:

Computer Science book collection of the Wilson Library was analyzed. Below is the report of the existing books at the Wilson Library.

An analysis of existing books

1. An Excel file listing of computer books(QA 75-76) currently in our online catalog.

   Total books = 610
   1958-79 201 = 33%
   1980-89 244 = 40%
   1990-99 152 = 25%
   2000+ 18 = 3%

   Suggestions: Only 25 books are OK to keep, the rest are not usable.

2. List of **netLibrary** books with "computer" subject heading:

   Total books=87
   1985-99 57 = 66%
   2000-03 30 = 34%

3. **elibrary** books with "computer" subject heading:

   Total books = 918
   1989-99 110 = 12%
   2000 126 = 14%
   2001 200 = 22%
   2002 302 = 33%
   2003 145 =16%
   2004 35 = 4%

There was a CHOICE Book Review database which was related to the computer and information science field (www.choicereviews.org). 67 books were found and the cost ranged $24.00-$68.00.

8. Course Syllabi

A copy of every course syllabi taught in the program is normally kept on file. Most of handouts distributed in class, homework assignments, midterm exams, as well as final exams are also filed in the program for future reference. Refer to Appendix M for a sample of course syllabi offered in fall 2004 – spring 2005 fiscal year. A sample of the midterm exams is presented in Appendix N. a sample of the final exams are presented in Appendix O.

9. Action Plan Items

After this intensive program review exercise and after analyzing the program's efficiency and effectiveness, the Computer Science faculty summarized all of the challenges that were identified by the consultant, focus group, SWOT analysis, students, and alumni and developed the following action plan list for the future.

13. Create an **advisory board**.

14. Revise the Program **Web Page** to be more appealing to prospective students.

15. **Faculty Resource:**

    a. All faculty members must remain current in the discipline. It is recommended that a significant part of each faculty member's workload be spent in receiving training in new technologies and acquiring new knowledge and skills. The changes in the field place heavy demands on Computer Science faculty who are required to tailor the curriculum to meet regional conditions, develop up-to-date instructional materials, and manage student projects and internships. Therefore, ULV should provide the Full time faculty members one course release per year to allow them to stay up to date with technology and attend any training sessions.

    b. All full time faculty members must have adequate office space for research.

    c. All Part time faculty members must have an office to have privacy while talking to students during their office hours.

16. Organization:

    a. Take the program to the next level. Consider becoming a separate department.

    b. Consider changing the name of the program from "Computer Science" (Obsolete name) to one that reflects current field, e.g." Computer Information Technology" or "Information Science".

    c. Rethink scheduling.

    d. Consider dropping the Computer Engineering concentration.

    e. Consider the possibility of operating under the College of Business.

    f. Take advantage of Information Technology faculty in the College of Business.

    g. Go for accreditation when ready.

17. **Physical Facilities**:

a. Provide rapid equipment replacement cycle with special infrastructure resources to support the requirements the curriculum.

b. Classrooms must be equipped with computer projection, Internet, and local network access, and appropriate computing and software infrastructure, so that the entire curriculum can be adequately delivered.

c. Laboratories must be equipped with computer workstations, network ports, high-speed Internet access and wireless capabilities.

d. Laboratories must be equipped with proper hardware parts to provide experience in designing, installing, and running networks.

e. Laboratories must be equipped to accommodate team projects essential to the Information Science concentration.

f. Laboratories must be equipped with state of the art electronic parts to provide experience in designing, implementing, and presenting projects.

g. Students must have a study lounge close to the faculty members' office.

h. The computers in the student lounge must be updated and should have access to the wireless network.

i. Classrooms must be presentable to attract new prospective students.

j. Provide adequate and specialized technical support to faculty and students.

18. Curriculum:

a. The program must formalize a Minor in Computer Science.

b. Modify all course syllabi in the program to include standard 5 "course outcomes".

c. Create course outlines (new course proposal) update the course objectives.

d. Emphasize the Web Computing concentration.

e. Develop certificate programs in specialized areas.

f. Develop concentrations in Data base management, network security, data warehousing and data mining, remote access/wireless computing, and supply chain management.

g. Develop multidisciplinary concentrations in graphic design, animation, and digital technologies.

h. Offer more hybrid courses.

i. Improve the senior project course to provide more guidance to students to increase the completion rate
j. Rewrite course outlines to better reflect course objectives and developing technologies.
k. Help senior project students better document code.

l. **Internship:**

1. Formalize and document the Internship program.

2. Change the IT work experience into internship, and enhance industry based internships.

3. Establish a community network to provide internship program and placement for students.

m. **New courses:**

1. The program must Introduce a course titled *Personal Productivity with IS Technology*

2. The program must introduce .NET courses.

3. Focus curriculum on "Front end" skills, such as webpage, visual basic, Java, C#, etc.

4. The program must introduce a new course titled “Special Topics”.

5. Introduce more courses for non major students.

6. Develop and offer variety of elective courses.

7. Design and offer workshops prior to scheduling the senior comprehensive exams.

9.1