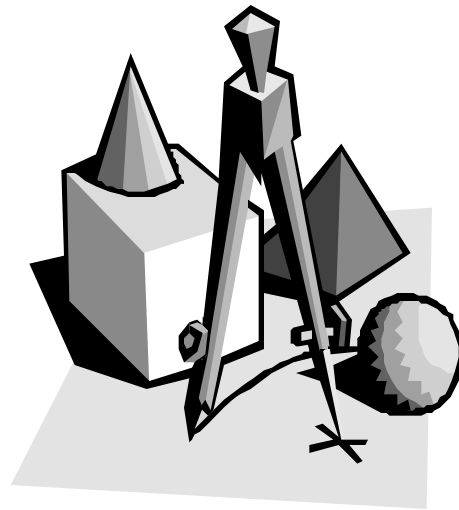


Program Assessment Report  
Civil Engineering  
2001



College of Engineering and Technology  
California State University, Los Angeles

**California State University at Los Angeles  
Civil Engineering Program Assessment**

**2001**

# Table of Contents

1. Introduction	3
2. Combined Resources of the College of Engineering and Technology	3
3. Status of College Vision and Mission Statement and Program Outcomes	4
4. Results of Assessment	10
Capstone Course	10
Senior Survey	12
EBI Survey	15
Web based Student Portfolios	19
F.E. Examination Results	23
Program Changes	24
5. Appendix	25
Senior Design Assessment Form	26
Webfolio Assessment Form	28

## List of Figures and Tables

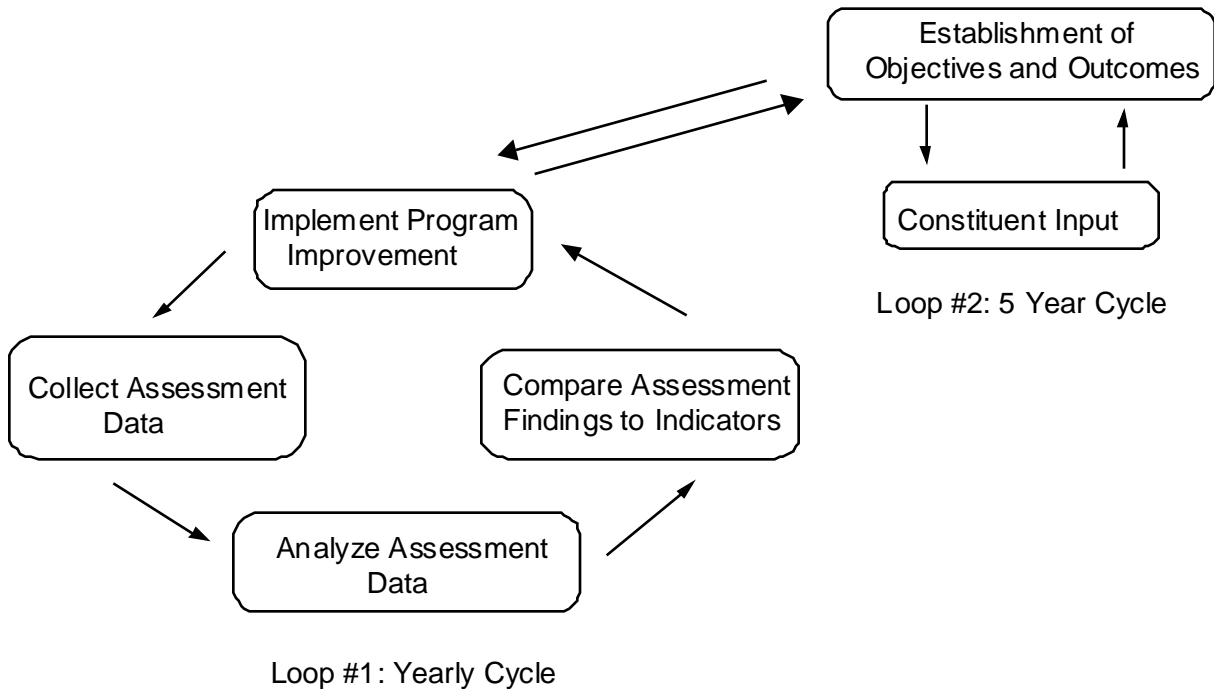
Figure 1: Program Assessment Cycle	3
Figure 2: Determination of Student Learning Outcomes	6
Table 1: Analysis of assessment data based on senior design oral presentation	12
Table 2: Analysis of assessment data based on senior student survey results	15
Table 3: Analysis of assessment data based on EBI senior student survey results	18
Table 4: Table 4: Analysis of assessment data based on webfolios by Faculty and Alumni	23

# 1. Introduction

In 1999 the Civil Engineering Program implemented a program assessment strategy based on student learning. The motivation for this is originated in four places.

1. The faculty
2. University Faculty Handbook.
3. New ABET Engineering Criteria 2000
4. The WASC Accreditation guidelines

The processes used to ensure achievement of the objectives and outcomes can be described through the two-loop figure shown below.



**Figure 1: Assessment Cycle**

Loop #1 is a "continuous" process, with one cycle completed each year. Implementation of this cycle will ensure the continuous improvement and development of the Cal State L.A. Civil Engineering program.

## 2. Combined Resources of the College of Engineering and Technology

It was decided to launch a co-operative, college-wide effort in which representatives of each of the programs work along with the dean and the college fiscal manager to implement the program assessment process. This process started at the beginning of spring quarter, 1999. Prior to the start of spring quarter, 1999, in cooperation with the chairs, one faculty member

was identified from each program/department to fill the role of departmental assessment coordinator. The following served as the Assessment Project Team for the current year.

- 1.) Russ Abbott – CS\*
- 2.) Charles Liu – EE
- 3.) Rupa Purasinghe – CE
- 4.) Ethan Lipton – Project Leader\*\*
- 5.) Darrell Guillaume – ME
- 6.) Keith Mew – Technology
- 7.) Ray Landis – Project Leader

**Note:** \* Russ Abbott joined the task force in Spring 2001

\*\* Ethan Lipton replaced Ray Landis as Project Leader in Summer 2001

### 3. Status of College Vision and Mission Statement and Program Outcomes

Since the beginning of the assessment process, the definitions of key terminology have been considered important. The table below provides the current definitions used by the assessment task force. This is a “living” list in that the number of terms grows and the definitions change over.

#### Definition of Key Terms

Term	Definition	Applicable Unit
Vision	Where we want to be or how we want to be viewed	College
Mission	Description of what we do (i.e., what “business” are we in)	College
Educational objectives	Broad statements of what know-ledge our graduates will have, what skills they will possess, and what attitudes they will hold	Programs
Program outcomes	Measurable indicators that educational objectives have been met (Generally more specific)	Programs
Performance indicators	Detailed metrics (measures) that indicate whether a specific out-come has been achieved	Program
Performance criteria	Performance level required to satisfy a particular performance indicator	Program
Constituents (Stakeholders)	A group of people with common expectations of an educational program (e.g., students, alumni, faculty,	College/ Program

	staff, employers)	
--	-------------------	--

The Vision and Mission statements for the Engineering and Technology Programs are as follows.

### **Vision Statement**

To be a pre-eminent engineering and technology program that prepares students from diverse backgrounds for productive careers by providing them with a student-centered, practically focused quality-learning experience.

### **Mission Statement**

The mission of the College of Engineering and Technology is to graduate well-educated engineers and technologists who are prepared to meet the challenges of a rapidly changing, increasingly complex world. This will be accomplished through:

- A well-qualified faculty who care about students and their success.
- A dynamic, up-to-date curriculum that has an optimal balance between theory and practice.
- Laboratories, computer facilities, and instructional classrooms on par with any engineering and technology program in the nation.
- Unique co-curricular opportunities for students such as participation in student design competitions, professional student organizations, and pre-professional employment.
- Opportunities for undergraduate and graduate students to participate in research and industry-funded design clinic projects.
- Mutually beneficial partnerships with area industry that take advantage of our location in one of most concentrated high-tech center in the nation.
- Strong cooperative relationships with local high schools and community colleges and with other four-year institutions.

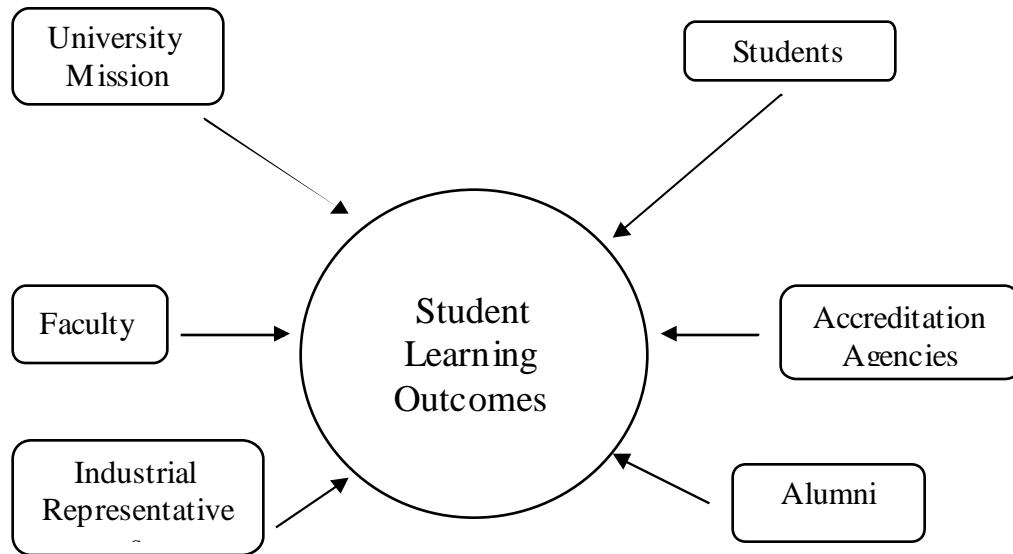
### **Status of Educational Objectives and Program Outcomes**

The next task for assessment was to develop the following:

- Educational objectives for each program
- Program outcomes for each educational objective

Educational objectives were defined as broad statements of attributes of graduates of the program. We decided to develop three such statements as follows:

1. One statement describing the knowledge that graduates will have
2. One statement describing the skills that graduates will possess
3. One statement describing the attitudes graduates will hold



**Figure 2: Determination of Student Learning Outcomes**

The process used to develop these statements was to seek input from various "constituencies" (program faculty, program students, industrial representatives including part time faculty, employers, and alumni) as to what knowledge, skills, and attitudes they believe graduates of the specific program should have. Based on these input, and ABET and ASCE criteria, the department assessment coordinator drafted the three educational objective statements and sought feedback from the program faculty as to how these statements should be revised and improved. Once the three educational objective statements were finalized for each program, then the original list of outcomes was refined and finalized. The final product of this phase of work was a sheet for our program (civil engineering) which is shown below.

**Civil Engineering Educational Objectives and Program Outcomes**

**a. Civil Engineering Program Outcomes**

The following are the Civil Engineering program outcomes that have been established based on the Program Educational Objectives.

**i. Knowledge**

*Educational Objective:*

Graduates of the Civil Engineering program will be knowledgeable in both practical and theoretical approaches to engineering design and problem solving and be aware of the effect of economics, humanities, and social sciences on engineering practice.

*Measurable outcomes:*

- i. knowledge of mathematics, science, and engineering principles (abet a)
- ii. the broad education necessary to understand the impact of engineering solutions in a global/societal context (abet h)
- iii. knowledge of information technology
- iv. knowledge of civil engineering design principles
- v. knowledge of current design specifications
- vi. knowledge of computer aided design
- vii. knowledge of current events and societal contemporary issues—non engineering related (abet j)
- vii a. understanding of civil engineering professional practice issues (ASCE criteria)
- vii b. an understanding of professional and ethical responsibility (abet f)

## **ii. Skills**

### *Educational objective:*

Graduates of the Civil Engineering program will have the skills to work individually and in teams to define, formulate, and solve problems by applying engineering fundamentals and modern tools, including computers, and be able to clearly communicate their work.

### *Measurable outcomes:*

- i. an ability to identify, formulate, and solve civil engineering problems (abet e)
- ii. an ability to plan and design operation of systems, components, or processes to desired needs and design code specifications (abet c)
- iii. an ability to work individually and on multidisciplinary teams (abet d)
- iv. an ability to communicate effectively orally (abet g)
- v. an ability to communicate effectively in written reports (abet g)
- vi. an ability to design and conduct experiments as well as analyze and interpret data (abet b)
- vii. an ability to use the techniques, skills and modern engineering tools necessary for engineering practice including computer tools and information technology (abet k)

## **iii. Attitudes**

### *Educational Objective:*

Graduates of the Civil Engineering program will have a positive outlook on life and a positive attitude toward working in cross-cultural settings and toward lifelong professional development through continuing education and professional registration.

### *Measurable outcomes:*

- i. will have a positive outlook on life
- ii. desire to work in cross-cultural settings
- iii. an understanding of professional and ethical responsibility (abet f)

- iv. willingness to adapt to professional and societal changes
- v. recognition of the need for and an ability to engage in lifelong learning (abet i)
- vi. desire to be successful in Fundamentals of Engineering Examination and become a registered professional civil engineer
- vii. appreciation of the role of professional engineering societies on the practice of civil engineering

### **The Assessment Process**

The Civil Engineering program has implemented an assessment effort and "continuous improvement" process to ensure that graduates meet and exceed the program outcomes.

To facilitate the implementation of the Civil Engineering assessment effort, the department has established the position of Program Assessment Coordinator. Four units of release time per quarter are provided to support this position. Dr. Rupa Purasinghe has served as Civil Engineering Program Assessment Coordinator since March 1999. In addition, the department has established a permanent Civil Engineering Assessment Committee. The following faculty are serving as the committee.

Rupa Purasinghe (Chair)  
Anjan Bhaumik  
Irving Kett  
Mark Tufenkjian  
Narendra Taly

The function of the Program Assessment Committee under the leadership of the Program Assessment Coordinator is to:

- Review program outcomes
- Review available assessment tools
- Select assessment tools appropriate to each outcome
- Implement the assessment tools
- Gather data
- Recommend changes in assessment tools to program faculty

The following assessment tools were selected for use in assessing Civil Engineering program outcomes:

1. Capstone design course
2. Webfolios
3. Surveys of seniors
4. Surveys of recent graduates
5. Surveys of employers
6. Writing prerequisite tests
7. Fundamental of Engineering Exam (FE)

The matrix shown below indicates the correspondence between assessment tools and program outcomes. These assessment tools are implemented throughout the year.

### Tools Used to Assess Each Program Outcome

	Capstone Course	Webfolios	Surveys (Employers, Seniors, Alumni)	FE Exam	Pretests
<b>Knowledge</b>					
Math/Science/Engr	No	No	Yes	Yes	No
Contemporary Issues	No	No	Yes	No	No
Broad Education	No	No	Yes	No	No
Ethics	No	No	Yes	Yes	No
<b>Skills</b>					
Experimental Work	No	Yes	Yes	No	No
Problem Solving	Yes	No	Yes	Yes	No
Design	Yes	Yes	Yes	No	No
Communication Skills	Yes	Yes (written)	Yes	No	Yes (WPE)
Work in Teams	Yes	No	Yes	No	No
Use Tools	Yes	No	Yes	No	No
Information Competency	Maybe	No	Yes	Yes	No
<b>Attitudes</b>					
Lifelong Learning	No	No	Yes	No	No
Professionalism	Yes	Yes	Yes	No	No
All Other Attitudes	No	No	Yes	No	No

To facilitate implementation of assessment tools, three subgroups were established:

Capstone Course (N. Taly and R. Purasinghe)

Web Portfolios and Surveys (M. Tufenkjian, I. Kett, and R. Purasinghe)

Prerequisite Tests/F.E. Exam (A. Bhaumik, Y. Kim, R. Purasinghe)

A second departmental task team – the Civil Engineering Program Improvement Task Team – is charged with the following responsibilities:

- Review and analyze assessment data
- Draw conclusions from the data

- Develop Civil Engineering program “strengths” and “areas for improvement”
- Develop action plans for changes needed to bring about the improvements

The current Program Improvement Task Team has the following membership:

Young Kim (chair)  
 Rupa Purasinghe  
 Ray Jeng  
 Crist Khachikian  
 Hassan Hashemian

As indicated, the Department Chair serves as the chair of this task team and has the responsibility of overseeing the implementation of the action plans and the process used by the Program Improvement Task Team for identifying “strengths,” and “areas for improvement,” and action plans based on data from employers, senior students, recent graduates, and department faculty.

The assessment tools implemented by the Civil Engineering Program and schedule for implementation are shown below.

<b>Assessment Tool</b>	<b>Implementation Frequency</b>	<b>Future Year Results Reported</b>
1 Capstone Design Course		
A Oral Presentation	Every Year	This report
B Written presentation	Every two years	2001-2002
2 Webfolios		
A Industry Assessment	Every Two years	2001-2002
B Faculty Assessment	Every Two Years	This report
C. Alumni Assessment	Every Two years	This report
3. Survey of Seniors	Every Year	This report
4 Surveys of recent graduates	Every Five years	2004-2005
5 Survey of Faculty	Every Five years	2004-2005
6 Survey of Employers	Every Five Years	2004-2005
7 Educational Benchmarking Inc. Survey	Every Year	This report
8. Fundamental of Engineering Exam	Every Year	This report

## **4. RESULTS OF ASSESSMENT**

### **Capstone Design Course**

#### **Oral Presentations.**

For the 2000/2001-assessment process, the final oral presentations were assessed by industrial representatives. In 2001 two industrial representatives assessed a total of six student groups in winter and spring 2001. The results are shown below.

**Senior Design Oral Presentation Assessment Results  
By Industrial Representatives  
2000, and 2001  
On a GPA Scale**

	2000	2001	2001 RATING						Average
<b>1) Design</b>			4	3	2	1	0	NA	
a) Defined objective	3.15	3.17	3	8	1	0	0	0	3.17
b) Plan of action	3.20	3.08	2	9	1	0	0	0	3.08
c) Alternatives considered		3.17	4	6	2	0	0	0	3.17
d) Model for design	3.15	3.25	6	4	1	1	0	0	3.25
e) Analyze data	3.45	2.92	3	5	4	0	0	0	2.92
f) Project costs considered		3.08	2	9	1	0	0	0	3.08
g) Interpretation of results	3.50	3.25	3	9	0	0	0	0	3.25
h) Iterations performed	4.00	3.17	3	8	1	0	0	3	3.17
i) Incorporated engineering standards		2.92	0	11	1	0	0	0	2.92
j) Incorporated realistic constraints		3.17	3	8	1	0	0	0	3.17
<b>2) Presentation</b>									
a) Organize the flow	3.15	3.25	3	9	0	0	0	0	3.25
b) Use visual aids	3.60	3.75	9	3	0	0	0	0	3.75
c) Use time effectively	3.55	3.50	6	6	0	0	0	0	3.50
d) Answer questions posed	3.25	3.50	6	6	0	0	0	0	3.50
<b>3) Modern engineering tools</b>									
	3.45	3.75	9	3	0	0	0	0	3.75
<b>4) Multidisciplinary team</b>									
	3.75	3.25	3	9	0	0	0	0	3.25
<b>5) Display professionalism</b>									
	3.90	3.42	5	7	0	0	0	0	3.42
<b>6) How well team demonstrated</b>									
i) Ability to identify, formulate, solve problems		3.33	4	8	0	0	0	0	3.33
ii) Knowledge of design		3.17	2	10	0	0	0	0	3.17
iii) Knowledge of specifications		3.00	1	10	1	0	0	0	3.00
iv) Ability to plan and design operation of systems		3.17	3	8	1	0	0	0	3.17
v) Ability to use techniques, skills, tools for engineering practice		3.33	5	6	1	0	0	0	3.33
vi) Ability to communicate effectively orally		3.25	3	9	0	0	0	0	3.25

Note: 2001: Two industrial representatives assessed 6 groups (4 winter , 2 spring)

The target threshold of 3.0/4.0 on a GPA scale was used to determine satisfaction of outcome based on this analysis for senior design assessment. Outcomes rated below 3.0/4.0 are considered as areas of improvements that we need to address.

**Table 1: Analysis of assessment data based on senior design oral presentation**

<b>Assessment Instruments</b>	<b>Strengths</b>	<b>Areas of Improvement</b>
<b>Senior Design Oral Presentations</b>	<ul style="list-style-type: none"> <li>• Define Objective</li> <li>• Interpretation of results</li> <li>• Ability to identify and solve problems</li> <li>• Ability to communicate orally</li> <li>• Organize the flow of communication</li> <li>• Use of visual aids</li> <li>• Use of modern tools</li> <li>• Work in multidisciplinary teams</li> <li>• Display Professionalism</li> <li>• Knowledge of design</li> </ul>	<ul style="list-style-type: none"> <li>• Analyze data</li> <li>• Incorporate Engineering Standards</li> </ul>

**Senior Survey**

The opinions of senior students were solicited in the senior design project course and the results are documented below. The table shows a comparison of 2001 results with that of 2000.

## Undergraduate Senior Students Survey

Senior Student Survey Results 2000, and 2001

4 = outstanding    0 = poor

**How satisfied are you with your education at CSULA in meeting the following:**

<b>Knowledge</b>	<b>2000</b>	<b>2001</b>
1. Knowledge of mathematics, science and engineering principles to solve engineering problems.	3.13	2.94
2. Understanding of the impact of engineering solutions can have on society.	3.17	3.18
3. Knowledge of current events and societal contemporary issues. (non-engineering related)	2.44	2.64
4. Knowledge of computer aided design.	2.94	3.09
5. Knowledge of current design specifications.	3.11	2.90
6. Knowledge of civil engineering design principles.	3.22	3.27
7. Understanding of professional practice issues.	3.17	3.18

### **Skills**

8. Ability to design valid experiments.	2.78	3.27
9. Ability to conduct an experiment.	2.97	3.18
10. Ability to analyze and interpret data obtained from an experiment.	2.97	3.18
11. Ability to plan/design a system, component or process to desired needs and design codes.	3.11	3.09
12. Ability to work individually.	3.59	3.27
13. Ability to work on multi-disciplinary teams.	3.35	3.18
14. Ability to orally present ideas on engineering designs or solutions.		3.36
15. Ability to write technical reports.		3.18
16. Ability to use modern engineering tools necessary for engineering practice such as computer tools.	3.11	3.09

**Do you agree that your education at CSULA provided the following**

### **Attitudes**

17. Understanding of professional and ethical responsibility.	3.17	3.20
18. Recognition of the need for life-long learning.	3.28	3.30
19. Have a positive outlook on life.	3.06	3.00
20. Have a desire to work in cross-culture setting.	3.06	3.40
21. Willingness to adapt to professional and societal changes.	2.89	3.30
22. Desire to become a registered professional engineer.	3.33	3.30
23. Appreciation of the role of professional engineering societies on practice of civil engineering.	3.50	3.30

## SENIOR STUDENT SURVEY RESULTS (2001)

Total 11 responses CONVERTED TO "4 to 0" GPA SCALE

**QUESTION: How satisfied are you with your education at CSULA in meeting the following:  
( 4 is very satisfied .....0 is very dissatisfied)**

Knowledge	RATING						Ave
	4	3	2	1	0	NA	
1. knowledge of mathematics to solve engineering problems	2	6	3	0	0	0	2.91
2. knowledge of science to solve engineering problems	1	7	3	0	0	0	2.82
3. knowledge of engineering principles to solve problems	4	4	3	0	0	0	3.09
4. an understanding of the impact of engineering solution can have on society	4	5	2	0	0	0	3.18
5. a knowledge of contemporary issues (current issues)	1	5	5	0	0	0	2.64
6. a knowledge of computer aided design	4	4	3	0	0	0	3.09
7. a knowledge of current design specifications	2	5	3	0	0	1	2.90
8. a knowledge of civil engineer design principles	5	4	2	0	0	0	3.27
9. an understanding of professional practice issues	5	4	1	1	0	0	3.18

### Skills

1. an ability to design valid experiments	5	4	2	0	0	0	3.27
2. an ability to conduct experiments	5	3	3	0	0	0	3.18
3. an ability to analyze and interpret data obtained from experiments	3	7	1	0	0	0	3.18
4. an ability to design a system, component or process to desired needs and design codes	4	4	3	0	0	0	3.09
5. an ability to work individually	5	4	2	0	0	0	3.27
6. an ability to work on multi-disciplinary teams	5	3	3	0	0	0	3.18
7. an ability to orally present ideas on engineering designs or solutions	5	5	1	0	0	0	3.36
8. an ability to write technical reports	3	7	1	0	0	0	3.18
9. an ability to use modern engineering tools necessary for engineering practice such as computer tools	3	6	2	0	0	0	3.09

**Do you agree that your education at CSULA provided the following:**

**4 is agree.....0 disagree)**

### Attitudes

1. an understanding of professional and ethical responsibility	5	2	3	0	0	1	3.20
2. a recognition of the need for life-long learning	5	3	2	0	0	1	3.30
3. to have a positive outlook on life	4	2	4	0	0	1	3.00
4. to have a desire to work in cross-culture setting	6	2	2	0	0	1	3.40
5. willingness to adapt to professional and societal changes	6	1	3	0	0	1	3.30
6. a desire to be come a registered professional engineer	5	3	2	0	0	1	3.30
7. an appreciation of the role of professional engineering societies on practice of civil engineering	5	3	2	0	0	1	3.30

The target threshold of 3.0/4.0 on a GPA scale was used to determine satisfaction of outcome based on this analysis for senior student survey assessment. Outcomes rated below 3.0/4.0 are considered as areas of improvements we need to address.

**Table 2: Analysis of assessment data based on senior student survey results**

Assessment Instruments	Strengths	Areas of Improvement
<b>Senior Student Survey</b>	<ul style="list-style-type: none"> <li>• Knowledge of impact of engineering solutions on society</li> <li>• Knowledge of engineering to solve problems</li> <li>• Knowledge of engineering design principles</li> <li>• Understanding of professional practice issues</li> <li>• Ability to work individually</li> <li>• Ability to work on multidisciplinary teams.</li> <li>• Ability to use modern engineering tools necessary for engineering practice.</li> <li>• Ability to orally present ideas on engineering design</li> <li>• Ability to write technical reports</li> <li>• Understanding of ethical responsibility</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge of contemporary issues</li> <li>• Knowledge of current design specifications</li> <li>• Knowledge of Math/Science to solve problems</li> </ul>

**EBI Survey**

Senior students were surveyed using national survey instrument EBI. Relevant portions of EBI results are shown below with comparison of 2000 results with that of 2001.

**Senior Students' survey results extracted from EBI (2000, 2001)**

	<b>CSLA Civil Engineering 2000</b>	<b>2001</b>
<b>Design and Conduct Experiments</b>		
To what degree did your engineering education enhance your ability to design experiments	3.02/4.00	3.42/4.0
To what degree did your engineering education enhance your ability to conduct experiments	3.02/4.0	3.04/4.0
To what degree did your engineering education enhance your ability to Analyze and interpret data	3.3/4.0	3.14/4.00
<b><i>Average for above sub groups</i></b>	<b><i>3.11/4.0</i></b>	<b><i>3.2/4.0</i></b>
	<b>CSLA Civil Engineering 2000</b>	<b>2001</b>
<b>Work in teams</b>		
To what degree did your engineering education enhance your ability to function on multidisciplinary teams	3.19/4.00	3.0/4.0
Ability of your fellow students to work in teams	3.33/4.0	3.15/4.0
How satisfied are you with the level of camaraderie of your fellow students	3.4/4.0	3.24/4.00
<b><i>Average for above sub groups</i></b>	<b><i>3.3/4.0</i></b>	<b><i>3.13/4.0</i></b>
	<b>CSLA Civil 2000</b>	<b>Engineering 2001</b>
<b>Identify/Formulate/Solve Problems</b>		
To what degree did your engineering education enhance your ability to identify, or formulate engineering problems?	3.47/4.0	2.95/4.00
To what degree did your engineering education enhance your ability to solve engineering problems ?	3.36/4.0	3.29/4.00
<b><i>Average score for above two groups</i></b>	<b><i>3.42/4.00</i></b>	<b><i>3.12//4.0</i></b>

	<b>CSLA Civil Engineering</b>	
	<b>2000</b>	<b>2001</b>
<b>Ethical Responsibility</b>		
To what degree did your engineering education enhance your ability to understand ethical responsibility ?	3.3/4.0	3.42/4.00
	<b>CSLA Civil Engineering</b>	
	<b>2000</b>	<b>2001</b>
<b>Communication</b>		
Ability to communicate using oral progress reports	3.16/4.0	3.0/4.0
Ability to communicate using written progress reports	3.09/4.0	2.95/4.0
	<b>CSLA Civil Engineering</b>	
	<b>2000</b>	<b>2001</b>
<b>Engineering solutions in a global context</b>		
To what degree did your engineering education enhance your ability to understand the impact of eng. solutions in a global/societal context ?	3.33/4.0	3.24/4.00
	<b>CSLA Civil Engineering</b>	
	<b>2000</b>	<b>2001</b>
<b>Life Long Learning</b>		
To what degree did your engineering Education enhance your ability to recognize the need to engage in Lifelong learning ?	3.5/4.0	3.0/4.00
	<b>CSLA Civil Engineering</b>	
	<b>2000</b>	<b>2001</b>
<b>Modern Tools</b>		
To what degree did your Engineering education enhance your ability to use modern eng. tools	3.22/4.00	2.80/4.0

**Table 3: Analysis of assessment data based on EBI senior student survey results**

<b>Assessment Instruments</b>	<b>Strengths</b>	<b>Areas of Improvement</b>
<b>EBI Senior Student Survey</b>	<ul style="list-style-type: none"> <li>• Function on multidisciplinary teams</li> <li>• Communicate effectively orally</li> <li>• Ability to work in multidisciplinary teams.</li> <li>• Design and conduct experiments</li> <li>• Ethical Responsibility</li> <li>• Engineering solutions in a global context</li> <li>• Life long learning</li> </ul>	<ul style="list-style-type: none"> <li>• Use of written reports <b>(but has 2.95/4.00)</b></li> <li>• Use of modern tools</li> <li>• Identify/Formulate problems</li> </ul>

## **Web based Student Portfolios**

A web based student portfolio was created using sample of student work in the following

- A resume
- A lab report
- An essay on Contemporary Issues
- An essay on their interpretation and commitment to life-long-learning.
- An extended abstract of their capstone design project

The internet location of the webfolio along with an assessment rubric was emailed to two alumni and three faculty to obtain their assessment of this sample work. Four completed student webfolios were assessed on the following abet outcomes.

- Abet (b) An ability to design and conduct experiments as well as to analyze and interpret data
- Abet (c ) An ability to plan and design a system, component, or process to meet desired needs and design code specifications.
- Abet (e) An ability to identify, formulate, and solve engineering problems
- Abet (f) An understanding of professional and ethical responsibility
- Abet (g) An ability to communicate effectively
- Abet (i) A recognition of the need for an ability to engage in lifelong learning
- Abet (j) A knowledge of current events and societal contemporary issues -- non-engineering related.
- Abet (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

**WEBFOLIO ASSESSMENT 2000 – 2001**  
**GPA Scale**

**WEBFOLIO ASSESSMENT RESULTS 2001**  
**Two Alumni responses of four student portfolios**  
**GPA Scale**

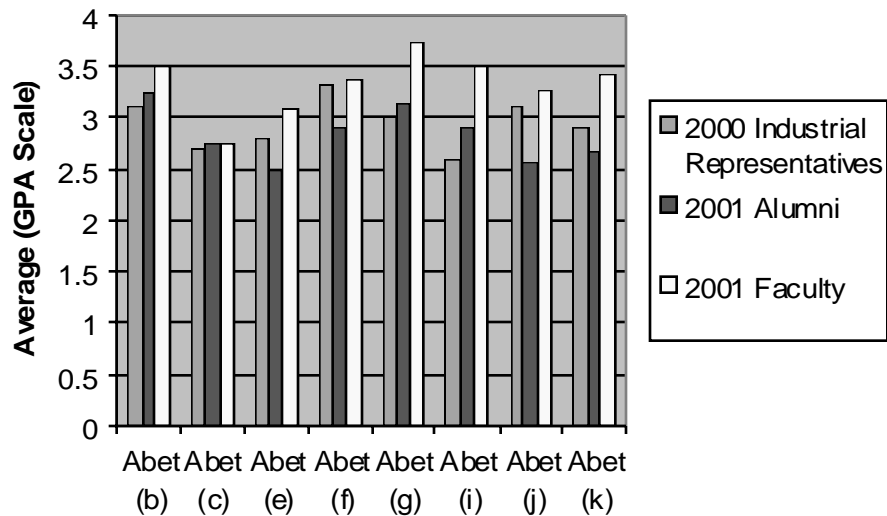
<b>(4 shows high ability...0 shows poor ability)</b>	<b>RATING</b>						
<b>KNOWLEDGE</b>	<b>4.0</b>	<b>3.0</b>	<b>2.0</b>	<b>1.0</b>	<b>0.0</b>	<b>NA</b>	<b>Ave</b>
<b>For the Benefits of Current Issues folder, how well the student demonstrated:</b>							
5. A knowledge of current events and societal contemporary issues- non engineering related (abet j)	1	2	4				2.57
<b>SKILLS</b>							
<b>For the Lab Report folder, how well has the student demonstrated:</b>							
12. An ability to design and conduct experiments as well as to analyse and interpret data obtained from an experiment abet (b)	2	6					3.25
<b>For the Senior Design Project Extended folder, how well has the student demonstrated:</b>							
13. An ability to design a system, component or process to desired needs (abet c)	2	2	4				2.75
8. Ability to identify, formulate and solve civil engineering problems (abet e)	1	1	1	1		4	2.50
<b>For the Overall Webfolio Presentation, how well has the student demonstrated:</b>							
17. An ability to communicate effectively in writing (abet g)	2	4	1				3.14
18. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (abet k)	0	2	1			5	2.67
<b>ATTITUDES</b>							
<b>For the Life Long Learning Plan Folder, how well has the student demonstrated:</b>							
20. A recognition of the need for life-long learning (abet l)	1	5	2				2.88
<b>For the RESUME folder, how well has the student demonstrated:</b>							
19. An understanding of professional and ethical responsibility (abet f)	1	6	1				3.00

**WEBFOLIO ASSESSMENT RESULTS 2001**  
**Three faculty responses of four student portfolios**  
**GPA Scale**

(4 shows high ability...0 shows poor ability)	RATING						
<b>KNOWLEDGE</b>	4.0	3.0	2.0	1.0	0.0	NA	Ave
<b>For the Benefits of Current Issues folder, how well the student demonstrated:</b>							
5. A knowledge of current events and societal contemporary issues- non engineering related (abet i)	5	4	2			1	3.27
<b>SKILLS</b>							
<b>For the Lab Report folder, how well has the student demonstrated:</b>							
12. An ability to design and conduct experiments as well as to analyse and interpret data obtained from an experiment abet (b)	6	6					3.50
<b>For the Senior Design Project Extended folder, how well has the student demonstrated:</b>							
13. An ability to design a system, component or process to desired needs (abet c)	2	6	3	1			2.75
8. Ability to identify, formulate and solve civil engineering problems (abet e)	4	6	1	1			3.08
<b>For the Overall Webfolio Presentation, how well has the student demonstrated:</b>							
17. An ability to communicate effectively in writing (abet g)	8	3	0	0	0	1	3.73
18. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (abet k)	6	5	1				3.42
<b>ATTITUDES</b>							
<b>For the Life Long Learning Plan Folder, how well has the student demonstrated:</b>							
20. A recognition of the need for life-long learning (abet l)	6	6	0				3.50
<b>For the RESUME folder, how well has the student demonstrated:</b>							
19. An understanding of professional and ethical responsibility (abet f)	5	1	2			4	3.38

**WEBFOLIO ASSESSMENT  
GPA Scale**

Outcome Measured	ABET #	2000 Industrial Representatives	2001 Alumni	2001 Faculty
Abet (b) An ability to design and conduct experiments as well as to analyze and interpret data.	Abet (b)	3.10	3.25	3.50
Abet (c) An ability to plan and design a system, component or process to meet desired needs and design code specifications.	Abet (c)	2.70	2.75	2.75
Abet (e) An ability to identify, formulate, and solve engineering problems	Abet (e)	2.80	2.50	3.08
Abet (f) An understanding of professional and ethical responsibility	Abet (f)	3.30	2.88	3.38
Abet (g) An ability to communicate effectively in writing	Abet (g)	3.00	3.14	3.73
Abet (i) A recognition of the need for an ability to engage in lifelong learning	Abet (i)	2.60	2.88	3.50
Abet (j) A knowledge of current events and societal contemporary issues - non-engineering related	Abet (j)	3.10	2.57	3.27
Abet (k) An ability to use the techniques, skills, and modern engineering tools	Abet (k)	2.90	2.67	3.42



**Webfolio Assessment 2000-2001**

**Table 4: Analysis of assessment data based on webfolios by Faculty and Alumni**

<b>Assessment Instruments</b>	<b>Strengths</b>	<b>Areas of Improvement</b>
<b>Web based Student Portfolios</b>	<ul style="list-style-type: none"> <li>• Ability to design and conduct experiments</li> <li>• Ability to communicate in writing</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to plan and design a system</li> <li>• Ability to identify and solve problems</li> <li>• Knowledge of current events and societal contemporary issues</li> </ul>

**Fundamental of Engineering Exam**

The F.E. results summary for engineering fundamental courses are summarized below. These are based on percent correct. Since our students' scores are generally below National average, we set our target to 85% of Carnegie average (15% percent below) for Masters Institutions. Our department wants to improve students' scores to National average (Carnegie average), but as a first step towards this, we are setting our target to 85%. Based on this comparison our student performance is almost satisfactory. The department has decided to start a new F.E. preparatory review course on an experimental basis beginning Summer 2001 to better prepare students for F.E. exam.

<b>Subject</b>	<b>A.m/P.m.</b>	<b>Oct. 00 to Apr. 01</b>	
		<b>CSULA Civil Ave.</b>	<b>85% of Carnegie Ave.</b>
<b>Computer</b>	<b>A.m.</b>	35	49
	<b>P.m.</b>	32	43
<b>Dynamics</b>	<b>A.m.</b>	49	51
	<b>P.m.</b>	32	33
<b>Engr Econ</b>	<b>A.m.</b>	47	52
	<b>P.m.</b>	33	34
<b>Ethics</b>	<b>A.m.</b>	51	66
	<b>P.m.</b>	67	67
<b>Fluids</b>	<b>A.m.</b>	46	48
	<b>P.m.</b>	28	32
<b>Maths</b>	<b>A.m.</b>	43	46
	<b>P.m.</b>	35	40
<b>Mech. of Mat.</b>	<b>A.m.</b>	33	44
	<b>P.m.</b>	43	35
<b>Statics</b>	<b>A.m.</b>	37	45
	<b>P.m.</b>	39	43
<b>Thermo</b>	<b>A.m.</b>	33	39
	<b>P.m.</b>	19	29
<b>Average for all subjects above</b>		<b>39</b>	<b>44</b>

## **Program Changes**

Based on the program assessment the civil engineering program has undertaken the following changes.

### **D) Written and Oral Communication**

A new course Civil Engineering Communication is being developed. The course deals with both written and oral communication training in a civil engineering project setting. This course will better prepare students for Senior Design Written and Oral presentations.

### **II) Senior Design Project**

The program has decided to change the CE 495 Civil Engineering Senior Design project course from one-quarter length to two-quarter length. This will allow better introduction of multidisciplinary design projects, teams, design constraints etc.

### **III) F.E. Exam Preparation**

To better prepare students for the F.E. exam the department has decided to have a Review Course on an experimental basis.

## **5. Appendix**

Group Number: \_\_\_\_\_

Today's Date \_\_\_\_\_

**SENIOR CIVIL ENGINEERING DESIGN PROJECT (CE495)**

**FINAL PRESENTATION ASSESSMENT SHEET**

**Please circle the appropriate response.**

**Industrial Representative Name** \_\_\_\_\_

**Affiliation:** \_\_\_\_\_

If applicable to the senior design project being presented, to what extent has the team demonstrated their ability to:

**(1 shows high ability ..... 5 shows poor ability)**

1) Design

	High		Low			
	1	2	3	4	5	NA
a) Clearly, defined objective?	1	2	3	4	5	NA
b) Devise a plan of action?	1	2	3	4	5	NA
c) Alternatives considered?	1	2	3	4	5	NA
c) Develop model for design?	1	2	3	4	5	NA
e) Analyze data?	1	2	3	4	5	NA
f) Project costs considered?	1	2	3	4	5	NA
g) Interpretation of results?	1	2	3	4	5	NA
h) Iterations performed?	1	2	3	4	5	NA
i) Incorporated engineering standards?	1	2	3	4	5	NA
j) Incorporated realistic constraints that include most (i.e. at least five) of the following considerations: economic;	1	2	3	4	5	NA

**(1 shows high ability ..... 5 shows poor ability)**

1) Presentation?

- a) Organize the flow of communication? 1 2 3 4 5 NA
- b) Use visual aids? 1 2 3 4 5 NA
- c) Use presentation time effectively? 1 2 3 4 5 NA
- d) Answer questions posed? 1 2 3 4 5 NA

2) Use modern engineering tools/techniques? 1 2 3 4 5 NA

3) Function on a multidisciplinary team? 1 2 3 4 5 NA

4) Display professionalism? 1 2 3 4 5 NA

6) **Based on overall presentation how well the team demonstrated the**

- i) ability to identify, formulate, and solve civil engineering problems (Abet e) 1 2 3 4 5 NA
- ii) knowledge of civil engineering design principles 1 2 3 4 5 NA
- iii) knowledge of current design specifications 1 2 3 4 5 NA
- iv) ability to plan and design operation of systems, components, or processors to desired needs and design code specifications (Abet c) 1 2 3 4 5 NA
- v) ability to use techniques, skills, and modern engineering tools necessary for engineering practice. 1 2 3 4 5 NA
- iv) ability to communicate effectively orally(Abet g) 1 2 3 4 5 NA

Additional comments:

Date: \_\_\_\_\_

Reviewer's Name: \_\_\_\_\_

Student's Name: \_\_\_\_\_

### CSLA CIVIL ENGINEERING WEBFOLIO ASSESSMENT - 2001

Please Consider the 4 Folders in the Student's Webfolio and rate the student's performance.

\*\*\* 4 shows high ability ..... 0 shows poor ability \*\*\*

NA shows that there is insufficient evidence to make a judgement

For the <b>Benefits of Current Issues</b> Folder, how well has the student demonstrated:	
<i>a knowledge of current events and societal contemporary issues -- non-engineering related. (abet j)</i>	4 3 2 1 0 NA 4= high 0= Low

For the <b>Lab Report</b> Folder, how well has the student demonstrated:	
<i>an ability to design and conduct experiments as well as to analyze and interpret data (abet b)</i>	4 3 2 1 0 NA

For the <b>Life Long Learning Plan</b> Folder, how well has the student demonstrated:	
<i>a recognition of the need for an ability to engage in lifelong learning (abet i)</i>	4 3 2 1 0 NA

For the <b>Resume</b> Folder, how well has the student demonstrated:	
<i>an understanding of professional and ethical responsibility (abet f)</i>	4 3 2 1 0 NA

For the <b>Senior Design Project Extended Abstract</b> Folder, how well has the student demonstrated:	
<i>an ability to design a system, component, or process to meet desired needs (abet c)</i>	4 3 2 1 0 NA
<i>an ability to identify, formulate and solve civil engineering problems (abet e)</i>	4 3 2 1 0 NA

For the <b>Overall Webfolio Presentation</b> , how well has the student demonstrated:	
<i>an ability to communicate effectively in writing (abet g)</i>	4 3 2 1 0 NA
<i>an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (abet k)</i>	4 3 2 1 0 NA