

A New Engineering Educator's Guide for Creating a Summer Engineering Internship Program

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Abstract

An internship experience can play a pivotal role during a student's educational journey. An internship provides a student with an outstanding opportunity to advance their qualifications both educationally and professionally. This paper presents an organizational framework for new engineering educators to plan, develop, and implement a simple yet effective internship program at their universities. The model for discussion is a summer internship program developed by a new engineering educator for the Civil Engineering Department at California State University, Los Angeles. A flowchart illustrating the sequencing of internship activities and a description of the program materials is presented. The paper also explores the benefits of developing such a program for a tenure-track professor.

Introduction

Most will agree that internships provide students with the opportunity to gain practical work experience, enhance their chances of academic success, advance their professional qualifications (including soft skills), and provide a competitive edge during their job search. The author's own personal experience as an intern was a defining moment as an undergraduate student. Exposure to tangible work experience and a glimpse of the relationship between theory and practice was an inspiration to work harder as a student and to pursue an advanced degree in Civil Engineering.

Recognizing the potential importance of the internship experience to more fully complement a student's education, a priority as a new engineering educator was to establish a summer internship program in the Civil Engineering Department. However, since no such program existed, a simple yet effective program was created. The goal of the internship program was to

provide California State University, Los Angeles (CSULA) Civil Engineering majors with an opportunity to gain practical summer work experience with a local engineering firm. This paper presents the organizational framework used to plan, develop, and implement the program. It is hoped that this paper will provide guidance for other new engineering educators interested in developing similar programs at their universities. An added benefit of developing such a program for a new engineering educator is the fulfillment of certain tenure criteria.

Setup and Procedures

In order to ensure the success of the internship program, a few important guidelines were adopted when organizing the conceptual framework for the program. First, the entire process was formalized as much as possible the first year in order to minimize the maintenance of the program during subsequent years. In this sense, program materials (e.g., application and evaluation forms, advertising flyers, internship logo, etc.) would have to be created for long-term use. Second, to minimize university administrative procedures, student participation in the program would be voluntary and would not earn credit toward a degree. Third, as an added benefit to the student and to reduce the need for outside resources, the internships would be paid positions compensated directly by the host companies. Fourth, to ensure quality control, the internship coordinator would have some knowledge of the host companies and intern supervisors. Fifth, the intern coordinator would match the student's interests and skills with the host companies. Sixth, the resources and expertise available at the University's Career Center would be used as much as possible.

The flowchart shown as Exhibit 1 illustrates the sequencing of activities from beginning to end along two parallel tracks: (1) company track and, (2) student track. The activities are described below in more detail according to the numbering shown on the far right-hand side of the flow chart.

Activity 1: *Solicit/Select Companies* - This step involved soliciting and selecting the host companies to participate in the program. Background information (such as anticipated intern duties, compensation rate, start date, etc.) was collected from the companies.

- Activity 2: *Application Review/Interview/Select Students* - At this point the student applications were distributed, collected, and the review process initiated. All eligible students were selected for an interview that was conducted by the faculty member and Career Center counselor. Based on the strength of the application and interview, the top ranked students were selected for an intern position.
- Activity 3: *Match Students with Companies* - The faculty member utilizing a simple matrix matched the selected students with the host companies.
- Activity 4: *Students and Companies Notified* - The students are notified of their selection as an intern and instructed to attend a workshop that will provide them with further assignment details. Host companies are also notified of selected student and receive student's resume. The student compensation rate and start date were confirmed by the faculty member.
- Activity 5: *Workshop* - Students are required to attend a workshop conducted by the Career Center to prepare them for successful internship appointments. Topics covered included interviewing skills and techniques, the importance of professional behavior and etiquette. Students receive information about their host company, compensation rate, typical duties, and start date.
- Activity 6: *Internships Begin* –Start and end dates may vary depending upon student and company constraints.
- Activity 7: *Student and Company Follow-up* - Students and host companies are contacted at least once during the summer to answer any questions or address any concerns.
- Activity 8: *Student and Company Evaluation Forms* - Students and host companies are requested to complete an evaluation survey of the internship experience in order to provide feedback on how to improve the program. Companies also receive a letter of appreciation for participating in the program.
- Activity 9: *Advertisement/Marketing* - An advertisement is placed in a local engineering publication acknowledging the host company participation among its peers. The advertisement also serves as a marketing tool for next year's program.

Development of Program Materials

Initially, a significant amount of effort was devoted to the development of program materials in order to give the program credibility and to reduce the maintenance required in the future. The table below identifies the program materials developed for this internship program and their purpose.

Program Material	Purpose
Internship Name & Logo	To be used on all internship program correspondence. Establishes identity and name recognition. Important for marketing. For instance, this program was named: <i>Geo-Intern</i> .
Summary Fact Sheet for Company Sponsors	Fact sheet detailing the purpose of the program, program description, potential company benefits, eligibility criteria for students, program duration, and student and company expectations.
Summary Fact Sheet for Student Interns	Same as above but also includes selection criteria for students.
Advertising Flyer	Advertise the internship program to students on campus. Inform students of application procedures and deadline for submittal.
Application Form	Obtain student information (name, address, telephone number, etc.), develop student profile, determine eligibility and availability, and to identify student desire from student essay. See Exhibit 2.
Company Sponsor Worksheet	Obtain host company information, number of interns they can support, hourly compensation rate for intern, and anticipated duties for intern.
Congratulatory or Rejection Letters to Students	Notification to students of acceptance or rejection. Accepted students instructed on what to do next.
Notification Letter to Sponsor Company	Notification of the selected intern with a copy of resume, explanation of screening process, estimated start date and program duration, and agreed upon compensation rate.
Sponsor Company Evaluation Form	Evaluation form designed to provide feedback from sponsor company on intern performance and program satisfaction.
Student Evaluation Form	Evaluation form designed to provide feedback on intern program, satisfaction with sponsor company, development of hard and soft skills, how well CSULA prepared the student for the work experience, and how CSULA's Civil Engineering curriculum might be improved to better prepare students.
Thank You Advertisement in Local Civil Engineering Newsletter	Display of gratitude to sponsor companies among peer companies, and marketing strategy to solicit additional companies in next year's program.

By making use of available resources at the Career Center, the expenses needed to operate the program were kept to a minimum. The majority of the cost incurred in developing the internship was the one-time expense associated with preparation of program materials. Since limited funding was available, a temporary part-time student was hired to assist the Career Center with these duties. However, this assistance is unnecessary. The only other operating cost of significance was postage for mailing.

Recruitment and Selection of Host Companies

There was apprehension at first about whether or not local Civil Engineering firms would embrace the idea of a summer internship program. The fear was that there would be too few company participants and too many qualified students. However, as it turned out company response was very favorable and soon more companies were available than interns.

The primary criterion used to select the host companies was familiarity of the employees who would be supervising the interns. Since the companies were all Civil Engineering firms, the author's previous consulting experience and networking in the industry was invaluable. If considering unfamiliar companies, it is recommended to learn as much about the company as practical and if possible speak directly with company employees who will be supervising interns. Other factors considered were the company proximity to the campus, the benefit of anticipated intern duties to the student's development, the company corporate culture, and compensation rate. Once the companies were selected they received a summary fact sheet describing the program as well as a sponsor worksheet which requested company information; number of interns they could support; hourly compensation rate and typical intern duties. Five companies were selected to host six interns for the summer of 1998. Five companies were considered manageable and it is recommended to limit the number of companies during start-up.

Recruitment and Selection of Student Interns

Minimum eligibility requirements were first established for the interns. The criteria for the program was undergraduate or graduate standing in Civil Engineering, minimum overall grade-point-average of 2.75 at CSULA, relevant coursework completed, and availability to work during the summer. The student recruitment process consisted of posting advertising flyers, announcing the internship program in the Civil Engineering classes, and calling all eligible students to inform them of the internship opportunity. Many of the recruitment activities were performed by the Career Center.

In order to be considered for an intern position, the students had to complete an application form and submit a resume. The application form required general student information (name, address, telephone number, etc.), availability to work 8 to 12 consecutive weeks during the summer, and a short student essay on why they wanted to participate in the program and what their expectations were. An example application form is presented as Exhibit 2.

The review process began as soon as all applications were received. Applicants who did not meet the minimum eligibility requirements were automatically disqualified. All eligible applicants were invited to an interview conducted by a Career Center counselor and the

internship coordinator. The purpose of the interview was to evaluate the student's commitment to the program, enthusiasm, and how well they would represent the University. The applicants were ranked according to the strength of their application, resume, and interview. The top ranked applicants (corresponding to the number of intern positions) were then selected for a summer intern position.

Matching Selected Students with Host Companies

One of the criteria established early on for the program was that the internship coordinator would match the interns with the host companies. The primary reason for this strategy was that the internship coordinator was the most knowledgeable of both the student and company and therefore was in the best position to make the decision. Second, this simplifies the selection process and avoids potential company disappointment if they do not get their first choice. During the company recruitment process, the companies were made aware that the primary purpose of the program was to enhance the educational experience of future engineers.

By creating a simple matrix of the student's interests, qualifications and skills, and comparing that with a matrix of the host companies interests and needs, one can sort through the selection process and find a best match between the two. In some instances, your "gut-feeling" on how a student's personality would mesh with a company's profile may play a role in the process.

However, in some cases what were thought to be the lowest ranked intern turned out to be the highest rated intern in terms of company evaluation results. There are always intangible qualities that cannot be assessed by grade-point-average, an application form, or an interview. These intangible qualities should be kept in mind during the intern selection process.

The Role of the Career Center

An invaluable resource during program development and implementation was the campus Career Center. They helped manage the program and run the day-to-day activities. They were instrumental in producing and reproducing program materials, handling mailings, and calling student recruits.

The Career Center also coordinated a workshop to work individually and collectively with the selected interns. Individually, a workshop counselor worked with students to improve their resumes and interviewing skills, and shared information on the importance of professional etiquette and behavior while on the job. Collectively, the workshop provided an excellent opportunity to officially introduce students with their summer intern assignments. A package of materials describing the host company, location, supervisor, compensation rate, and typical duties were provided. University and company expectations of each intern were reviewed and interns were reminded that they were representing the university.

The Importance of Program Objectives, Expectations, and Communication

An important aspect of the success of the program was clearly defining program objectives, discussing student and company expectations with all parties involved, and ensuring a properly functioning feedback loop. Program objectives and expectations were discussed with both students and companies very early on. Host companies and students were encouraged to contact the internship coordinator if a question or concern should arise before, during, or after the internship.

In order to monitor the progress of the intern/company relationship, it is highly recommended to contact both the intern and host company at least once during the internship assignment. In this way, questions or concerns can be addressed and corrected before developing into potential problems. The host companies especially appreciated this.

Program Assessment

Survey forms completed by student interns and host companies evaluated program success. One goal of the assessment was to provide feedback and suggestions on how to improve the program. Additionally, student evaluation forms provided data on the development of any hard and soft skills, as well as how the Civil Engineering curriculum at CSULA could have better prepared the students for the assignment. The company evaluation forms also provided information about whether or not the students were prepared academically and professionally and how the Civil Engineering department might better prepare its students to enter the workforce. The evaluation forms were also crafted to provide documentation to be used to satisfy tenure-related criteria as

discussed in the next section. Examples of the company sponsor and student evaluation forms are shown as Exhibits 3 and 4. Bar graphs summarizing the results of the evaluation forms are shown as Exhibits 5 and 6.

Benefits

An internship program is a “win-all” situation that benefits the student, host company, university, as well as the faculty member coordinating the program. Among other things, an internship experience benefits a student by providing them with the opportunity to gain practical work experience, see the relationship between theory and practice, and expand their professional contacts. The host company benefits by contributing to the profession by enhancing the educational experience of future engineers. The internship also provides the company with an excellent source of temporary and potentially permanent personnel, as well as developing a partnership with the university for future employment needs and cooperative assignments. The university benefits by having a means of assessing its students by industry practitioners whom will someday be hiring its students. Collection of this type of information is important when developing or modifying curricula, or when being used as an outcomes assessment tool of its students for accreditation purposes.

A tenure-track faculty member also stands to benefit from the process. The internship program can satisfy tenure performance objectives in the service areas of educational performance, professional achievement, and university service. Student and company survey results can be used as documentation in the educational performance area by demonstrating that the faculty member is providing students with educational enrichment. Also, by interacting with host companies and the engineering community a faculty member will increase his/her visibility as well as expand professional contacts. With increased visibility and additional networking, industry-academic partnerships may be forged. A proactive faculty member may generate the opportunity to engage in consulting assignments and/or industry research projects. For example, as a result of the industry-academic partnership formed as a result of the internship program, the author was able to initiate a joint research project with one of the host companies. The research project, which is jointly funded by the company and university, will be used to support service in the professional achievement category.

Development of an internship program contributes to the university service area by providing students with summer employment, developing a positive image of your engineering graduates among the engineering community, as well as demonstrating their preparedness to enter the workforce. Additionally, the internship program may also be used as a model for establishing other internship programs among faculty members inside and outside the department.

Summary

An internship can add significant value to a student's education. This paper demonstrates that a simple yet effective internship program can be developed and implemented to enhance a student's educational experience, and in fact can be leveraged to satisfy tenure criteria for a new engineering educator. An organizational framework for planning a summer internship program was presented along with a flowchart illustrating the sequencing of internship activities and a description of program materials. The benefits of developing such a program for an engineering educator includes satisfying tenure criteria in the service areas of educational performance, professional achievement, and university service.

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Mark Tufenkjian is an Assistant Professor of Civil Engineering at California State University, Los Angeles. He received his Ph.D. degree in Civil Engineering from UCLA. Prior to entering academics he worked for several internationally recognized geotechnical engineering firms in Southern California. He is a registered Civil Engineer in California. For further information or material about the *Geo-Intern* program described in this paper, please feel free to contact Professor Tufenkjian at mtufenk@calstatela.edu, or (323) 343-4434.

Exhibit 1

CSULA Summer Engineering Internship Program

Flowchart Illustrating Sequencing of Internship Activities

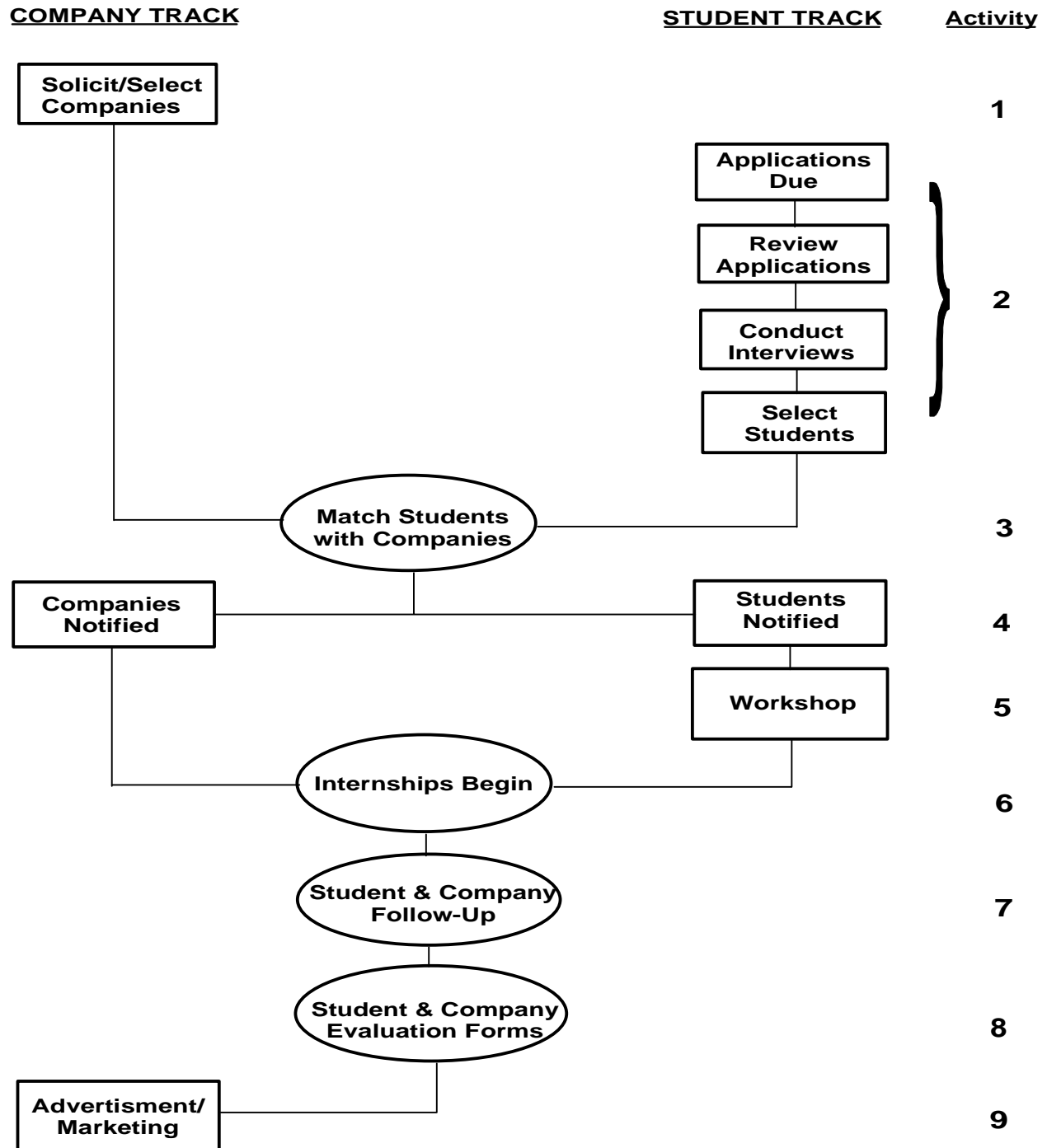


Exhibit 2
CSULA Summer Engineering Internship Program
Student Application Form

**CSULA GEOTECHNICAL
SUMMER INTERNSHIP PROGRAM**
APPLICATION FORM



Name _____
Last First Middle

Address _____

Telephone Number _____ SID _____

Academic Level _____ Overall GPA at CSULA _____

☐ US Citizen ☐ Permanent Resident ☐ Student Visa

Do you have a current driver's license and access to your own transportation? _____

Will you have completed CE 366 and CE 368 by Spring Quarter, 1998 with a grade of "B" or better in each class?
If not, explain.

If you have completed equivalent coursework at other institutions (or additional geotechnical engineering courses),
describe below the content of the course(s), where taken, and the letter grade obtained.

Do you have any work experience in the civil engineering or geotechnical engineering field? Describe (include
typical duties, date of employment, etc.)

List and describe any activities (honors, clubs, sports, hobbies, etc.)

Are you available to work full-time beginning as early as Monday, June 15, 1998 for a period of 8 - 12 consecutive
weeks? If not, explain _____

On an attached sheet, describe in 150 words or less why you want to participate in the Geotechnical Internship
Program and what your expectations are.

Exhibit 3
CSULA Summer Engineering Internship Program
Company (Sponsor) Evaluation Form



CALIFORNIA STATE UNIVESITY, LOS ANGELES
CIVIL ENGINEERING DEPARTMENT

Geotechnical Summer Internship Program

SPONSOR EVALUATION

Date _____

Name of Student _____

Sponsor Company _____

Supervisor _____

Feedback from the sponsor companies is an integral part of ensuring ongoing quality assurance and quality control of the internship program. Please take the time to answer the questions below as honestly and thoughtfully as possible. Use additional sheets if necessary.

1. We were satisfied overall with the internship program.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE
2. We were satisfied overall with our intern.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE
3. The duration of the internship was sufficient.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE

If not, please suggest an alternate length: _____

4. The student seemed to be prepared academically.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE
5. Other than academically, the student seemed to be prepared in terms of dependability, professionalism, attitude, etc.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE

Exhibit 3 (continued)
CSULA Summer Engineering Internship Program
Company (Sponsor) Evaluation Form

6. What, if any, academic or personal qualities was the intern lacking?

7. In what ways could the Civil Engineering Department at CSULA better prepare the students to enter the workforce?

8. We were satisfied with the accessibility of the internship coordinator.

STRONGLY AGREE *AGREE* *NEUTRAL* *DISAGREE* *STRONGLY DISAGREE*

9. We would recommend this internship program to other companies.

STRONGLY AGREE *AGREE* *NEUTRAL* *DISAGREE* *STRONGLY DISAGREE*

If not, why not?

10. We would participate in this program again.

STRONGLY AGREE *AGREE* *NEUTRAL* *DISAGREE* *STRONGLY DISAGREE*

11. Other comments and recommendations to improve the program:

Exhibit 4
CSULA Summer Engineering Internship Program
Student Evaluation Form



CALIFORNIA STATE UNIVERSITY, LOS ANGELES
CIVIL ENGINEERING DEPARTMENT

Geotechnical Summer Internship Program

STUDENT EVALUATION

Date _____

Name: _____ School Rank: FR SPH JR SR GRAD

Department: _____

Sponsor Company: _____

Dates of Employment: _____

Company Supervisor: _____

Feedback from interns is an integral part of ensuring ongoing quality assurance and quality control of the internship program. Please take the time to answer the questions below as honestly and thoughtfully as possible. Use additional sheets if necessary.

PART I

Please circle the most appropriate answer.

1. I was satisfied overall with the internship program.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE
2. I was satisfied overall with my host company.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE
3. I would recommend this internship program to other students.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE
4. The internship added value to my educational experience at CSULA.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE
5. The internship will be helpful to my career.
STRONGLY AGREE AGREE NEUTRAL DISAGREE STRONGLY DISAGREE

Exhibit 4 (continued)
CSULA Summer Engineering Internship Program
Student Evaluation Form

PART II

In the table below, check the appropriate column.

My internship provided me with at least some experience in or development of the following:

	ITEMS	YES	NO	N/A
1	Career Networking			
2	Engineering Technical Skills			
3	Communication Skills			
4	Presentation Skills			
5	Problem-Solving Skills			
6	Teamwork			
7	Leadership			
8	Project Management			
9	Time Management			
10	Ethics			
11	Office Skills			

Exhibit 4 (continued)
CSULA Summer Engineering Internship Program
Student Evaluation Form

PART III

1. What suggestions would you provide in order to improve the program?

2. In what ways did your engineering educational background and experiences at CSULA help you during the internship?

3. List the ways the Civil Engineering curriculum at CSULA could have better prepared you for your internship experience?

4. What did you like most about your internship?

5. What did you like least about your internship?

6. Additional comments if desired.

Signature

Exhibit 5
CSULA Summer Engineering Internship Program
Sponsor Evaluation Results

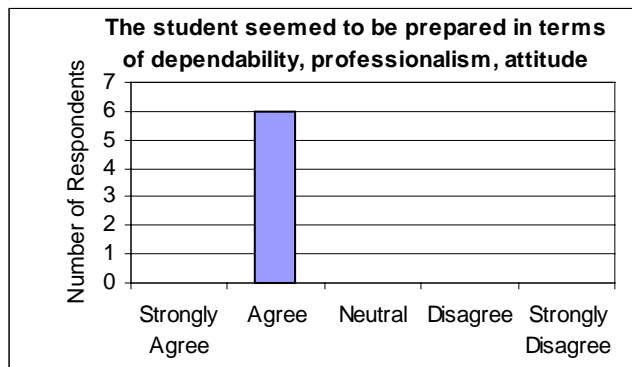
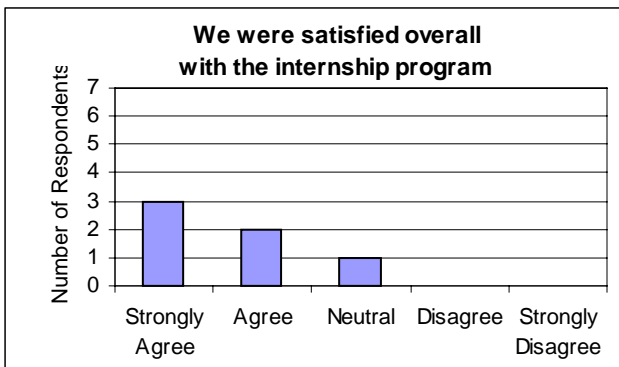
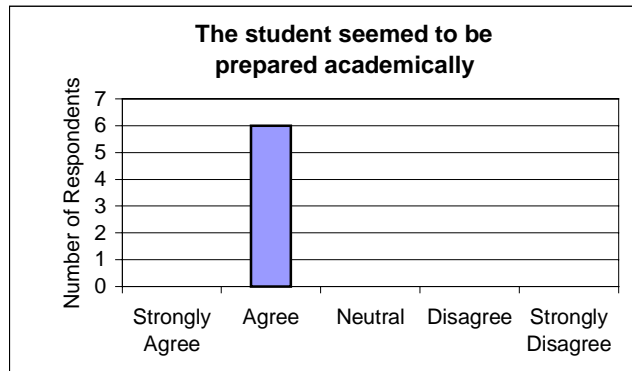
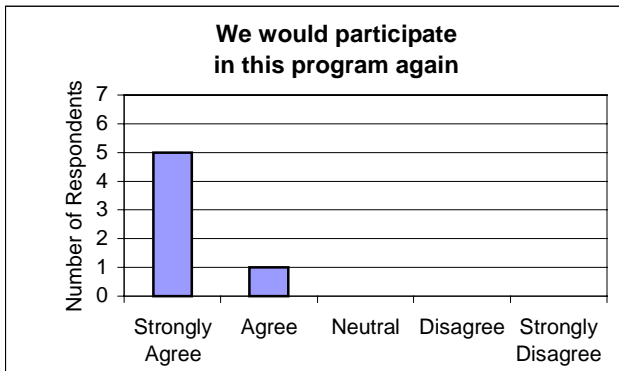
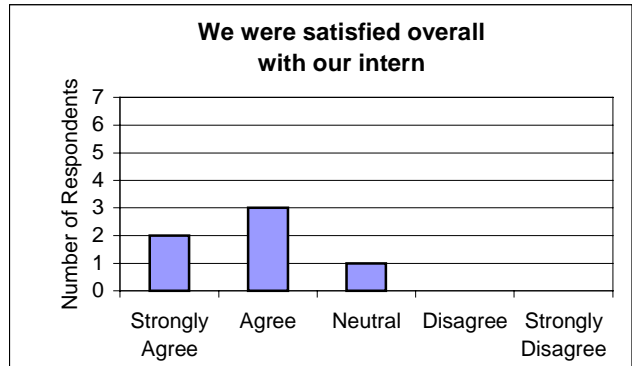
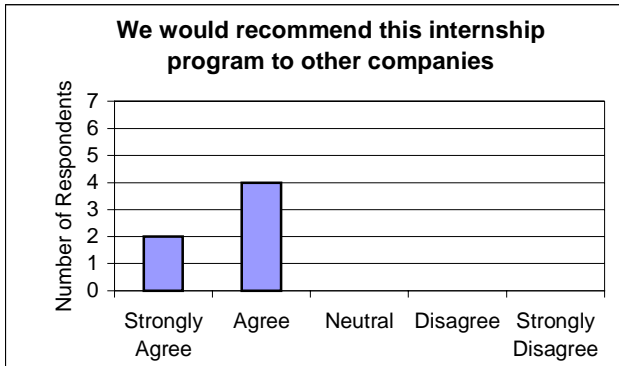


Exhibit 6

CSULA Summer Engineering Internship Program

Student Evaluation Results

