ANNUAL PROGRAM REPORT

College	College of Science
Department	Engineering
Program	Computer Engineering
Reporting for Academic Year	2016-17
Last 5-Year Review	2015-16
Next 5-Year Review	2021-22
Department Chair	Saeid Motavalli
Date Submitted	10-14-2017

I. SELF-STUDY *(suggested length of 1-3 pages)*

A. Five-Year Review Planning Goals

Present your planning goals from your last 5-year plan.

The concern raised by the accreditation agency (ABET) was that the program needed additional faculty to be able to serve the growing student population.

B. Progress Toward Five-Year Review Planning Goals

Report on your progress toward achievement of the 5-Year Plan. Include discussion of problems reaching each goal, revised goals, and any new initiatives taken with respect to each goal.

We intend to request a tenure-track position this academic year.

C. Program Changes and Needs

Report on changes and emerging needs not already discussed above. Include any changes related to SB1440, significant events which have occurred or are imminent, program demand projections, notable changes in resources, retirements/new hires, curricular changes, honors received, etc., and their implications for attaining program goals. Organize your discussion using the following subheadings.

Overview: The Computer Engineering program was established in 2007 as an option under engineering. The program is now a standalone accredited major. The enrollment in the program has been increasing consistently. Three tenure-track faculty, Roger Doering, Howard Lei and James Tandon, support this program. Howard lei and James Tandon are on leave of absence this quarter. Howard lei is on a yearlong leave.

Curriculum: we have transformed the curriculum in transition to semester offering. The transformed curriculum satisfies accreditation requirements and in line with the needs of the constituents.

Students: The number of students has increase from 19 in 2012 to 126 in 2016.

Faculty: Three tenure-track faculty serve the Computer Engineering program. In the current quarter, two of them are on leave of absence.
Staff: We have two full time staff for the School of Engineering, Mrs. Paula Trujillo and a laboratory technician, Mr. Brandon Xia.

Resources: As part of the College of Science renovation plan a large lab space (SSC 125) has been dedicated as research facility for electronics and computer engineering.

Assessment: Computer engineering is an accredited program. As part of the accreditation process, a systematic assessment and evaluation plan has been in place for four years. The details of assessment activities are given below.
Other: *(e.g., major program modifications)*

II. SUMMARY OF ASSESSMENT *(suggested length of 1-2 pages)*

A. Program Learning Outcomes (PLO)

a. Ability to apply knowledge of mathematics, science, and engineering.
b. Ability to design and conduct experiments, as well as to analyze and interpret data.
c. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
d. Ability to function on multidisciplinary teams.
e. Ability to identify, formulate and solve engineering problems.
f. Understanding of professional and ethical responsibility.
g. Ability to communicate effectively.
h. Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
i. Recognition of the need for, and an ability to engage in, life-long learning.
j. Knowledge of contemporary issues.
k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

ILO to PLO mapping is shown below:

ILO	THINK CRITICALLY AND CREATIVELY AND APPLY ANALYTICAL AND QUANTITATIVE REASONING TO ADDRESS COMPLEX CHALLENGES AND EVERYDAY PROBLEMS	COMMUNICATE IDEAS, PERSPECTIVES, AND VALUES CLEARLY AND PERSUASIVELY WHILE LISTENING OPENLY TO OTHERS	APPLY KNOWLEDGE OF DIVERSITY AND MULTICULTURAL COMPETENCIES TO PROMOTE EQUITY AND SOCIAL JUSTICE IN OUR COMMUNITIES	WORK COLLABORATIVELY AND RESPECTFULLY AS MEMBERS AND LEADERS OF DIVERSE TEAMS AND COMMUNITIES	ACT RESPONSIBLY AND SUSTAINABLY AT LOCAL, NATIONAL, AND GLOBAL LEVELS	DEMONSTRATE EXPERTISE AND INTEGRATION OF IDEAS, METHODS, THEORY AND PRACTICE IN A SPECIALIZED DISCIPLINE OF STUDY
I.E. B.S. PLO	2,3,9,10	7	8	4	6	1,5,11,

B. **Program Learning Outcome(S) Assessed**

List the PLO(s) assessed. Provide a brief background on your program's history of assessing the PLO(s) (e.g., annually, first time, part of other assessments, etc.)

PLO (e): An ability to identify, formulate, and solve engineering problems

PLO (j): A knowledge of contemporary issues

C. **Summary of Assessment Process**

Summarize your assessment process briefly using the following sub-headings.

Instrument(s): Evaluation of student-submitted responses to assignments, projects, and/or quizzes/exams using objectively-defined rubrics.

Sampling Procedure: All submissions assessed
Sample Characteristics: Wide ranges in the number of submissions due to varying classes sizes and student group sizes. Sample sizes range from 6 (when there are only 6 student groups in a course), to over 30.
Data Collection: Collected by course instructor *(include when, who, and how collected)*
Data Analysis: Analyzed by course instructor

D. **Summary of Assessment Results**

Summarize your assessment results briefly using the following sub-headings.

Main Findings:

Please see the D.1 Assessment Data section below for detailed assessment results and rubrics for PLO (e) and (j), for previous quarters as well as for quarter in the 2016-17 academic year. Results from previous quarters are provided to display trends in student performance in these PLOs. Each PLOs maps to several different Performance Indicators. Data for the assessed Performance Indicators are shown.

For PLO (e), students were asked to identify correct assembly language instruction sequences to implement a mini software algorithm. Performance has fluctuated across quarters due to differences in instructor and student make up of each course. In Fall 2016, students showed improved performance on a new set of problems that were not used in previous quarters. These new problems were a better fit to the course content.

For PLO (j), students have demonstrated consistently high performance across the previous quarters, and that level of performance is maintained during the Winter, 2017 quarter. For Winter 2017, students worked in groups, with 6 groups in the class. Work from all 6 student groups were assessed.

D.1 ASSESSMET DATA

PLO (e): An ability to identify, formulate, and solve engineering problems

Performance Indicator: Identify assembly language instructions needed to implement software algorithms.

Rubric:
(1) Identified correct assembly instructions for less than 20% of algorithms
(2) Identified correct instructions for greater or equal to 20% but less than 50% of algorithms
(3) Identified correct instructions for greater than or equal to 50% but less than 80% of algorithms
(4) Identified correct instructions for 80% or more of the algorithms

Assessment 1:
Quarter: Winter, 2014
Course: CS 2430
Item: Multiple-choice assessment problems
Average score (out of 4): 2.29 (35 submissions)
Score of 1: 3 Score of 2: 20 Score of 3: 9 Score of 4: 2
Score of 3 or higher: 31.4%

Assessment 2:
Quarter: Spring, 2014
Course: CS 2430
Item: Multiple-choice assessment problems
Average score (out of 4): 2.79 (19 submissions)
Score of 1: 1 Score of 2: 5 Score of 3: 10 Score of 4: 3
Score of 3 or higher: 68.4%

Assessment 3:
Quarter: Spring, 2015
Course: CS 2430
Item: Multiple-choice assessment problems
Average score (out of 4): 2.39 (23 submissions)
Score of 1: 0 Score of 2: 14 Score of 3: 9 Score of 4: 0
Score of 3 or higher: 39.1%

Assessment 4:
Quarter: Winter, 2016
Course: CS 2430
Item: Final Exam, Problem 1
Average score (out of 4): 2.85 (39 submissions)
Score of 1: 4 Score of 2: 11 Score of 3: 11 Score of 4: 13
Score of 3 or higher: 61.5%

Assessment 5:
Quarter: Fall, 2016
Course: CS 2430
Item: Multiple-choice assessment problems
Average score (out of 4): 2.63 (24 submissions)
Score of 1: 0 Score of 2: 12 Score of 3: 9 Score of 4: 3
Score of 3 or higher: 50.0%
**Note: assessment problems administered online immediately after final exam; students given a period of 12 hours to complete the assessment.*

Rubric for Assessment 6 (more difficult rubric):

(1) Identified correct assembly instructions for less than 20% of algorithms
(2) Identified correct instructions for greater or equal to 20% and less than or equal to 50% of algorithms
(3) Identified correct instructions for greater than 50% but less than 80% of algorithms
(4) Identified correct instructions for 80% or more of the algorithms

Assessment 6:
Quarter: Fall, 2016
Course: CS 2430
Item: Final Exam, Problem 1
Average score (out of 4): (31 submissions)
Score of 1: 0 Score of 2: 11 Score of 3: 13 Score of 4: 7
Score of 3 or higher: 64.5%
**Note: problems more in-line with the material taught during the quarter*

PLO (j): A knowledge of contemporary issues

Performance Indicator: Research the components needed to implement a system design. Also explain how the system design addresses the clients' needs.

Rubric:
(1) Did not research any components nor explain how the system design addresses clients' needs
(2) Researched some components but did not explain how the system design addresses clients' needs
(3) Researched most or all components and somewhat explained how system design addresses clients' needs
(4) Researched most or all components and fully explained how system design addresses clients' needs

Assessment 1 (A1):
Quarter: Winter, 2015
Course: ENGR 1011
Item: Desktop computer assignment
Average score (out of 4): 3.15 (20 submissions)
Score of 1: 0 Score of 2: 4 Score of 3: 9 Score of 4: 7
Score of 3 or higher: 80%

Assessment 2:
Quarter: Winter, 2016
Course: ENGR 1011
Item: Final project report
Average score (out of 4): 3.38 (8 submissions)
Score of 1: 0 Score of 2: 1 Score of 3: 3 Score of 4: 4
Score of 3 or higher: 87.5%

Assessment 3:
Quarter: Winter, 2017
Course: ENGR 1011
Item: Final project report
Average score (out of 4): 3.5 (6 submissions)

Score of 1: 0 Score of 2: 1 Score of 3: 1 Score of 4: 4
Score of 3 or higher: 83.3%

Recommendations for Program Improvement: Students have maintained consistently high performance for the PLO (j) performance indicator. Hence, no immediate curricular changes are needed to address PLO (j). For the performance indicator for SLO (e), we seek to improve assessment results through placing greater emphasis on teaching the assembly-level instructions in the CS 2430.

Next Step(s) for Closing the Loop: Since the assessment process for the Computer Engineering program has been implemented only in recent years, more assessment data is needed for the faculty to better discern trends in the data. For the time being, the plan is to have faculty continue to collect and assess student artifacts in accordance to the rubrics we developed.

Other Reflections: N/A

E. **Assessment Plans for Next Year**

Summarize your assessment plans for the next year, including the PLO(s) you plan to assess, any revisions to the program assessment plan presented in your last five-year plan self-study, and any other relevant information.

Next, year, we plan to assess PLOs (c) and (h). No immediate revisions to the program assessment plan is expected.

III. DISCUSSION OF PROGRAM DATA & RESOURCE REQUESTS

Discussion of Trends & Reflections

The data provided by CAPR appear not to reflect the correct enrollment numbers for the Computer Engineering Program. I have extracted the following data from the Pioneer Data Warehouse indicating a continuous growth in the number of majors in the Computer Engineering Program.

Term	College	Department	Gender	Ethnicity	Bachelor	Total	Minor
Fall Quarter 2012	Total				24	24	0
Fall Quarter 2013	Total				64	64	0
Fall Quarter 2014	Total				103	103	0
Fall Quarter 2015	Total				130	130	0
Fall Quarter 2016	Total				140	140	0

Notable Trends:

1. Growth in enrollment

2. Strong industry demand for the graduates

3. Active Advisory Board Council

4. Maintaining accreditation

Reflections on Trends and Program Statistics:

We are preparing a proposal to add an undergraduate Civil Engineering program. The addition of this program will improve the School of Engineering statistics and lower FTES costs.

Request for Resources *(suggested length of 1 page)*

1. Request for Tenure-Track Hires, We plan to request for one tenure track position in this academic year if Dr. Lei decides not to come back from his leave. The following is a portion of the findings of the accreditation visiting team indicating the need for an additional faculty member to keep up with student demand. We have to address this concern.

Program Concern

1. Criterion 6. Faculty This criterion requires the program to demonstrate that the faculty members are of sufficient number and they have the competencies to cover all of the curricular areas of the program. It further states that there must be sufficient faculty to accommodate adequate levels of student-faculty interaction, student advising and counseling, university service activities, professional development, and interactions with industrial and professional practitioners, as well as employers of students. Student enrollment in the program has grown rapidly in recent years, increasing from 19 to 58 to 102 students over three years. The local demand by industry for computer engineers and the limited access to other computer engineering programs in the region are expected to foster continued growth. Although present levels of student-faculty interaction are adequate, maintaining this with increasing numbers of students will put pressure on faculty time available for the range of activities mentioned in this criterion. Therefore, future compliance with this criterion may be jeopardized.

   - 30-day due process response: The program did not provide a response to this shortcoming.
   - The concern remains unresolved.

2. Request for Other Resources