

ENGINEERING ANNUAL REPORT 2012-2013

DATE SUBMITTED: May 15, 2013

TO: The Committee on Academic Planning and Review (CAPR)

FROM: Saeid Motavalli, Chair of Engineering

SUBJECT: Annual Report for Engineering

PURPOSE: For CAPR Annual Report

ACTIONS

REQUESTED:

The Engineering Department offers two undergraduate engineering degree programs, Computer Engineering and Industrial Engineering. We also offer one graduate degree program in Engineering Management. The Industrial Engineering degree program is accredited by the Accreditation Board for Engineering and Technology (ABET). Computer Engineering is the newest engineering major which we started in 2007. We are planning to apply for ABET accreditation of the Computer Engineering program during the 2015-16 accreditation cycle. This schedule would match the next accreditation evaluation of our Industrial Engineering program.

The last 5-year CAPR review of the engineering program was conducted in 2011. The CAPR review report concluded that the engineering programs should continue without modifications. Since our 2011 review the following changes have been implemented.

- The B.S. degree in engineering with options in Computer and Industrial Engineering have been discontinued and replaced with two stand-alone B.S. degrees, one in Computer Engineering and the other in Industrial Engineering.
- A yearly schedule for assessment of program L.Os. has been generated. The program L.Os. have remained unchanged to match with the recommended (a-k) learning outcomes suggested by ABET. These are as follows:
 - 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.
- We have developed a schedule for yearly assessment of these outcomes (see appendix).
The assessment activities are as follows:
 - The courses have been linked to outcomes (see Appendix)
 - An assessment report by the faculty teaching each course is generated.
 - Annual surveys of graduating seniors, employers, and alumni to assure that our curriculum adequately prepares students for employment have been conducted.

- We have used the data for continuous improvement.
- We summarize all these reports and present the summary to our Industry Advisory Board that regularly meets in June of each year. The board members suggest program modifications based on the results of assessment. The board includes faculty, student representatives, alumni representatives and industry members.
- Many changes have been implemented as a result of our assessment. These include, development of new electives for Engineering Management (ENGR 6999, ENGR 6090) and revision of course contents based on faculty assessment of courses.

CAPR suggested the following goals for Engineering in their last five-year review.

- Continued enrollment growth in all programs, especially the new undergraduate Bachelor of Science degrees in Industrial Engineering and Computer Engineering
- Strengthening of its faculty to include new tenure-track positions in Industrial Engineering and Computer Engineering (as well as seeking an additional position to support the program in Construction Management)
- Enhancement of technical support to maintain its various computer labs and its software systems
- Development of additional graduate-level electives in Industrial Engineering and increased frequency of offerings of core courses to keep pace with growing enrollment and to maintain appropriate class sizes
- Securing of the necessary resources to replace/upgrade the computers in all the Engineering Laboratories and secure annual software license renewals
- Add to Engineering department computing capacity by the addition of new computers to existing lab space and by adding a dedicated laboratory to support the Construction Management program

Our achievements on pursuing these goals are as follows:

- The engineering enrollment has steadily grown as shown in the data tables provided by Institutional Research.
- Faculty are involved in outreach to students in community colleges in the Bay Area. We are actively involved in outreach activities organized by the University. Our MESA program conducts yearly MESA competition days where more than 500 students from the Bay Area high school and middle schools come to campus to compete in math and engineering projects.
- We have extended an offer to a faculty candidate to join the Computer Engineering program, starting Fall 2013.
- We have increased the frequency of offering graduate courses. As an example we offer ENGR 6200 every quarter.
- We have replaced all the computers in VBT 223, our main computer laboratory. We are in the process of renovating the SSC 137 to create a new Concrete laboratory for our Construction Management program. All the engineering software is up-to-date.

Appendix

Curriculum Mapping to Learning Outcomes for Industrial and Computer Engineering and Assessment Tools and Schedule

Yearly Outcomes Assessment Schedule:

Winter Outcome Assessment schedule

Outcome	Course
(a)	ENGR 3101, 1420
(c)	ENGR 4430
(e)	ENGR1011
(g)	ENGR 4350
(k)	ENGR4610

Spring Outcome Assessment schedule

(e)	ENGR 1011
(e), (a)	ENGR 2010
(b), (c)	ENGR 3020
(g)	ENGR 3140
(i), (j)	ENGR 3841
(a), (k)	ENGR 4200
(c), (d), (j)	ENGR 4280

Fall Outcome Assessment schedule

(b)	ENGR 3190, ENGR 4440
(d)	ENGR 4610-20
(f)	ENGR 1011, 4620
(h)	ENGR 4620
(i)	ENGR 4620
(j)	ENGR 3190, ENGR 4620

Evaluation of outcomes for Industrial Engineering
I=introduction, P=practice, M=mature

Industrial Engineering	Program and Criterion 3 Outcomes											
	(a) Apply math/science engineering	(b) Design/conduct experiments	(c) Design system/component/process	(d) Function on multidisciplinary	(e) Solve engineering problems	(f) Understand professional/ethical responsibility	(g) Communicate	(h) Understand global/societal	(i) Recognize life-long learning	(j) Know contemporary issues	(k) Use engineering techniques/skills/tools	IE Program Criteria
<i>Courses in the Curriculum</i>												
General Education						I	I	I				
Mathematics	I	I										
Natural Sciences	I											
Engineering Core												
ENGR 1011 Engr. an Intro.					I	I				I		
ENGR 2010 Electric Circuits	P				P							
ENGR 2060 Material Sceince	P											
ENGR 3101 Statics and Dyns.	P				P							
Program Required Courses												
CS 1160 Intro. to CS & Prog.	I											
ECON 2301 Microeconomics	I											
ENGR 1420 Engr. Graphics	I		I									
ENGR 2070 Fund. Of Manuf.	I											
ENGR 3020 Wk. Dsgn., Meas.	P		P		P						I	
ENGR 3140 Engr. Economy	P				P		P					
ENGR 3190 Human Factors	P		P		P			P		P	I	I
ENGR 3601 Stat. for CS/Engr. I	P											
ENGR 3602 Stat. for CS/Engr. II	P	I										
ENGR 3841 Operations Res.	P				P				I		P	
ENGR 4100 Prod. Planning	P				P							
ENGR 4200 Simulations	M	P			P						P	P
ENGR 4280 Design and Mgmt. Human Work Systems			P	P		P		P	P	P		
ENGR 4300 Quality Engr.	M				P							
ENGR 4350 Reliability Engr.	M				M		P					
ENGR 4400 Manufacturing Systems Engineering			P	P	M		P		P		P	
ENGR 4430 Facilities Plan.	M		M		M		P					P
ENGR 4440 CIM	M		M		M						P	
ENGR 4610, 4620, Senior Design I, II			M	M	M	M	M	M	M		M	M

