College	Science
Department	Engineering
Program	B.S. Industrial Engineering
Reporting for Academic Year	2016-2017
Last 5-Year Review	09/2016
Next 5-Year Review	
Department Chair	Saeid Motavalli
Date Submitted	9/14/2017

ANNUAL PROGRAM REPORT

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

A. Five-Year Review Planning Goals

1. *The major change will be the transfer to a semester-based program. The Industrial Engineering curriculum has been transformed in such a way that it both satisfies the accreditation requirements and will produce technically stronger graduates. This has been accomplished by fundamental changes to courses, teaching methods and course requirements.*

2. *Faculty: As mentioned in accreditation review report following the 2015 visit, we have to address their observation that the program needs additional faculty before the next visit.*

3. *Research: The Industrial Engineering faculty are active in research and are being successful in securing funds for their research. The faculty plan is to aggressively pursue funding opportunities, specifically in areas related to the advancement of engineering education.*

4. *Laboratory Development: Room SCS 247, Materials Testing Laboratory, is being remodeled to a lab-lecture room with a capacity of 36. Flexible furniture suitable for active learning practices have been installed.*

5. *Equipment: Through A2E2 annual funding and the normal refresh cycle of computers by IT we are keeping the Industrial Engineering Laboratories current. There is a need for new equipment in the area of automation in manufacturing.*

6. *Enrollment: Student enrollment in Industrial Engineering program has remained steady in recent years.*

7. *Excess credits: The program requires 192 credit hours to complete. The exemption for Engineering has been approved by the University and allowed by the Chancellor's Office. We have kept the program requirements at the minimum level required for accreditation.*

B. Progress Towards Five-Year Review Planning Goals

1. *Successfully transformed the curriculum to a semester-based program.*

2. We are planning to request one tenure track position for the industrial engineering program as suggested in the findings of our last accreditation visit report.
3. The remodeling of materials lab SSC 247 has been completed and it is used as lab/active learning classroom.
4. Enrollment in industrial engineering has remained steady as indicated by University data.
5. The program credit requirement is in line with the quarter system and is being-finalized during the catalog review.

B. Program Changes and Needs

Overview: *The industrial engineering program started in the year 2000 and has been steadily growing with the enrollment stabilizing in the past three years. Since 2004 we have not hired any faculty for this program. Our last accreditation review was conducted in the Fall quarter of 2015. Their findings included the fact that the program needs new faculty members to stay current. We are planning to request a faculty position for this program in this academic year.*

Curriculum: *The transformed curriculum is designed to include more active learning practices and includes courses and material that are in line with the employment trends for industrial engineers.*

Students: *Demand for industrial engineering graduates are relatively strong. Most of our graduates are employed in engineering positions mainly in the Bay Area.*

Faculty: *Since 2004 we have had 3 faculty dedicated to the industrial engineering program and M.S. in engineering management. These include Drs. Helen Zong, David Bowen and Farnaz Ganjeizadeh. The program needs one additional tenure-track position*

Staff: *We have two full time staff for the School of Engineering, Mrs. Paula Trujillo and a laboratory technician, Mr. Brandon Xia.*

Resources: *We have to upgrade our Manufacturing processes equipment. We plan to develop a proposal to submit to the College of Science that would include equipment such as table top machine tools and small robotic arms.*

Assessment: *An extensive assessment process is in place for the industrial engineering program. Sample results are provided in the following section.*

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

Program Learning Outcomes (PLO)

1. *Ability to apply knowledge of mathematics, science, and engineering.*
2. *Ability to design and conduct experiments, as well as to analyze and interpret data.*
3. *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.*
4. *Ability to function on multidisciplinary teams.*
5. *Ability to identify, formulate and solve engineering problems.*
6. *Understanding of professional and ethical responsibility.*

7. *Ability to communicate effectively.*
8. *Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.*
9. *Recognition of the need for, and an ability to engage in, life-long learning.*
10. *Knowledge of contemporary issues.*
11. *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,

Program Learning Outcome(S) Assessed

We have assessed the following PLOs for the Industrial Engineering program during the 2016-17

Ability to apply production planning techniques in real life scenarios via case studies	Formulate and solve a production planning problem in teams	Demonstrate understanding of production planning applications (team	Formulate and solve complex final project real life scenario -final team project

Academic Year:

2016-2017	
1.Which PLO(s) to assess	PLO 5 **an ability to identify, formulate, and solve engineering problems** This outcome was assessed in INDE 4100, Production Planning and Control by Dr. Ganjeizadeh Winter of 2017 PLO 10 - **a knowledge of contemporary issues in Engineering** This PLO was assessed by Dr. Bowen in ENGR 4610 Senior Design ,Winter of 2017

Summary of Assessment Process:

Assessment of PLO (5)

		presentation evaluated by faculty and peers)	

Class project reports and exams are used to assess this outcome.

Summary: This course (INDE 4100) involves hands on as well as application of theory in solving engineering problems. The course includes hands on lab activities. Alumni have evaluated the course material as valuable in their professional career. The performance indicators for assessment of this outcome and the rubric used are as follows.

Analyzing and Solving Engineering Problems	Minimal analysis was performed.	Analysis tools were used but incorrectly applied or interpreted.		Analysis was performed, but opportunities for increased insight were missed.	The problem and information were effectively analyzed using multiple engineering analysis tools.	
	1	2	3	4	5	6 7

The average over all measurement tools was 4.00, which is considered as achieving the outcome.

Assessment of PLO (10)
Capstone project that included globalization group activity and discussion is used to assess this outcome. This outcome is assessed considering the following performance indicators

Ability to understand globalization and cultural differences as it relates to working in their project groups and with their project clients at practice level.
Globalization group activity (P/NP).
Oral presentation and final written report (Faculty assessment according to rubric)
Sampling Procedure: All student reports and projects are assessed. Data is collected every quarter the course is taught.
Summary of Assessment Results

Main Findings: *Senior project reports did not specifically addressed the use of realistic constraints as indicated by our accreditation team. We have since required student teams to specifically emphasize several realistic constraints they addressed in their reports. These include economic, social, ethical, sustainability and other constraints. These changes were reported to our accreditation agency in June 2016. The revised rubric and project requirements have been used last Spring quarter for the first time and will be used every year to evaluate senior design projects.*

Assessment Plans for Next Year

We will assess the following PLO's in this academic year.

12. *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.*

8. Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

11. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

DISCUSSION OF PROGRAM DATA & RESOURCE REQUESTS

The industrial engineering program started in the Fall of 2000 and has been steadily growing with the enrollment stabilizing in the past three years. Since 2004 we have not hired any faculty for this program. Our last re-accreditation review by ABET was conducted in the fall quarter of 2015. Their findings included a program observation cited below, indicating that the program needs new faculty members to stay current. We have not requested tenure track positions since the accreditation visit. We have to address this observation well before the next accreditation visit.

Program Observation

1. The School of Engineering indicated that it plans to open a search for an additional faculty member to support the BS and MS programs overseen by program faculty.

Discussion of Trends & Reflections

The data provided by CAPR appear not to reflect the correct enrollment numbers for the Industrial Engineering an Engineering Management programs. I have extracted data from the Pioneer Data Warehouse shown below:

Term	College	Department	Gender	Ethnicity	Bachelor	Master	Total	Minor
Fall Quarter 2012	Total				18	36	54	0
Fall Quarter 2013	Total				54	49	103	0
Fall Quarter 2014	Total				78	98	176	0
Fall Quarter 2015	Total				109	103	212	0
Fall Quarter 2016	Total				119	89	208	0

The enrolment in the two programs combined have stabilized at around 210, with an equal proportion of undergraduate and graduate students. The sizes of the two programs are around national average for an

industrial engineering program. With three faculty members serving both programs, we are at a minimum requirement for an accredited program.

Notable Trends:
1. Stabilization of the 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*: The equipment for the manufacturing automation and processes courses are extremely out of date such that none of the software that controls the machines works with the new Windows computers. We are planning to submit a proposal to the College of Science for acquisition of table-top machine tools and small robots. These are essential equipment for the viability of the program.*

Request for Tenure-Track Hires: *We have to add a tenure-track faculty within the next 2-3 academic years to keep the program current.*

Request for Other Resources