Annual Program Plan 2019-2020 (Industrial Technology-Engineering Graphics and Engineering) Latest Version

Annual Program Plan

APP Section I: Program/Department Description Annual Program Plan: Version by **Cheung, Elizabeth** on **10/31/2018 21:08**

The Engineering Graphics & Design Technology program at Pierce College is designed to provide students with well-rounded skills and knowledge in design and manufacturing technologies, including CAD software and knowledge of design and manufacturing processes and drafting standards. Students may earn an A.S. degree and/or a Certificate of Achievement in Engineering Graphics and Design Technology. Graduates of the program are positioned to obtain mechanical drafter or designer jobs in the areas of manufacturing and product development. In some instances, students go on to pursue a baccalaureate degree in an industrial technology program. Many students who are planning to transfer in mechanical engineering also take the introductory Engineering Graphics course and/or the 3D Computer-Aided design course as a requirement for their bachelor's degree.

The certificate and degree programs require a core set of Engineering Graphics & Design Technology courses, as well as courses in machining technologies. The sequence of core EG&DT courses begins with Engineering Graphics (EGD TEK 101), after which students can take both Fundamentals of 2D Computer-Aided Drafting (EGD TEK 111) and 3D Computer-Aided Design (EGD TEK 210). 3D Computer-Aided Design is a prerequisite to the final core course, Engineering Design (EGD TEK 310). These updated courses were first offered in the Fall 2013 semester. The new certificate and updated degree received state approval in December 2013.

The Engineering program consists of a Pre-Engineering A.S. degree, and the following Engineering courses: ENG GEN 101, Introduction to Engineering; ENG GEN 131, Statics; and ENG GEN 220, Circuit Analysis. Statics has C-ID articulation with ENGR 130, Intro to Engineering has C-ID articulation with ENGR 110. The Circuit Analysis course was approved in Spring 2018, and will be offered in Spring 2019 for the first time. It is articulated with CSUN's ECE 240 course, and we have requested C-ID articulation with ENGR 260. These three courses articulate to several bachelor's degree programs in various engineering majors. There are a few other courses we would like to develop and offer in order to help students meet lower division engineering requirements, including Materials Science & Engineering and Programming for Engineers (Matlab).

APP Section II: Status of 2017-2018 Goals Annual Program Plan: Version by **Cheung, Elizabeth** on **10/31/2018 21:08**

2017-2018 Goals	SMP Goal (X.1)	Status (Completed or Not Completed)	If goal not completed, briefly describe the reason
Increase access to 3D printing and other prototyping equipment in order to give students hands-on, project-based learning experiences.	D5	Completed	undefined
Increase access to CAD software and tutoring to enable students to perform CAD work outside of dedicated class time.	D5	Completed	
Establish Makerspace as an integral part of EG&DT program and campus life	D8	Not Completed	We have not been able to secure a space on campus for the Makerspace. Right now there is equipment in the AT building, but the space is inadequate for a full scale makerspace.
Increase students persisting in EG&DT courses – from one course to next	A1	Not Completed	
Increase number of underrepresented minorities in EG&DT (females, Hispanics)	A4	Not Completed	Further recruiting/outreach efforts are needed.
Faculty to stay current with technology	B6	Completed, ongoing	
Implement Collaboratory to connect students to real-world projects with outcomes that benefit the local community.	D8	Completed, ongoing	

APP Section III: Analysis of Data Annual Program Plan: Version by **Cheung, Elizabeth** on **10/31/2018 21:08**

Success, retention and persistence rates
Engineering Graphics & Design Technology:

Success and retention data:

There is an equity gap for success with Hispanic, Latino and with Unknown or Unreported groups. There is an equity gap for retention with Hispanic, Latino and Two or More Races groups.

Enrollment:

Enrollment data

Fall enrollment has been declining in the program since Fall 2016, after reaching a peak in Fall 2015. EGD TEK 111 was cancelled in Fall 2017 and offered in Spring 2018 instead. The same happened in Fall 2018, and it is planned to be offered in Spring 2019. However, comparing academic years, the enrollment has still been declining:
2015-16: 240
2016-17: 194 (-46 from previous year)
2017-18: 173 (-21 from previous year)
The decline in enrollment is seen in EGD TEK 111 and 101, not in EGD TEK 210. EGD TEK 310 is only offered in the spring and therefore does not show up in the institutional data set provided.

Engineering:

Degrees and certificates awarded

Degrees and certificates awarded

There is room for improvement in the number of students being awarded degrees and certificates in Engineering Graphics & Design Technology. One of the main ways to improve is through recruitment and marketing of the programs. EGD TEK 310 was recently articulated with CSUN's ME 286, and EGD TEK 101 and 210 are already articulated with CSUN's ME 186. We will explore a new, low-unit, certificate that includes these three courses plus one other, which should increase the number of certificates awarded in the program. Earning the proposed low-unit certificate, and even the existing certificate of achievement may be beneficial even to these transfer students as it makes them more marketable for internships. We recently replaced CAOT 32 with CAOT 55 as a course required for the certificate and degree. CAOT has English 101 as a prerequisite, which may be prohibitive for many CTE students. The CAOT 55 course is appropriate to prepare students for communication skills in the workplace. The IND TEK 130 Manual Machining course also required for the programs is only offered on Saturdays. While this does accommodate the schedules of many working students, it may not accommodate many others. A weekday offering of the course may also improve the number of students who complete a degree or certificate.

Although students transfering in engineering do not need an A.S. to do so, we could encourage them to obtain the degree to increase the number of degrees awarded.

Program learning outcomes assessment results
Engineering Graphics & Design Technology:

Engineering:

Improvements or plans made as a result of dialogue surrounding course or program outcomes data
Faculty who teach EGD TEK 210 will explore ways to improve CSWA passing rates.
Licensure passage rates
N/A
Job placement rates
The data shows a 100% job placement rate for Engineering Graphics & Design Technology degree and certificate programs.
Faculty (including FT/PT ratios)
There is currently a single full time faculty member in the Engineering Graphics & Design Technology and Engineering programs. She is also the Industrial Technology department chair, so time is limited. There are two full time Electronics faculty members who are qualified to teach electrical engineering courses.

APP Section III: Other Data (if applicable) Annual Program Plan: Version by **Cheung, Elizabeth** on **10/31/2018 21:08**

Metric	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Certified SolidWorks Associate (CSWA)				10	18

APP Section III: Other Data (discussion) Annual Program Plan: Version by **Cheung, Elizabeth** on **10/31/2018 21:08**

Discuss any longitudinal trends in the above data and improvements based on these trends
Engineering Graphics & Design Technology:
Changes in enrollment: Additional outreach is needed to increase enrollment and certificate/degree completion. We have had more focused CTE counseling, which is anectodotally helping, but additional data is needed to support this. We recently articulated EGD TEK 310 with CSUN's ME 286, which is a sophomore level course in their Mechanical Engineering program. This articulation is expected to boost our enrollment, which should help increase program completers. We will explore pursuing a state approved 12-unit certificate for the 4 EGD TEK courses. This is currently a departmental skills certificate and is therefore not documented as students meet the requirements. We are also pursuing articulation with local high schools.
Section offerings: Section offerings have remained unchanged, except that EGD TEK 111 was cancelled in Fall 2017 and 2018 due to low enrollment, and was offered in Spring 2018 and 2019 (planned). It has recently been modified to remove the prerequisite, which should improve future enrollment.
FTEF: FTEF has remained at 0.80
Success and retention rates: The course retention and success rates do not show a changing trend, and meet or exceed the set rates, except for EGD TEK 101 in some semesters. This is the first course in the sequence.
Degrees and certificates awarded: In 2015-16 there were 2 certificates of achievement and 1 AS degree awarded. In 2016-17 there were 4 certificates of achievement and 4 AS degrees awarded. By percentage this is a substantial increase, but the numbers are low.
Full-time/part-time faculty ratios: The FT/PT ratios have gone up and down. With a small offering of classes this fluctuation is not a current cause for concern.

Engineering (ENG GEN):
Changes in enrollment: Fall enrollment has remained relatively consistent since Fall 2014 when it bumped up from the previous year. Spring enrollment increased beginning in Spring 2018, the first time statics (ENG GEN 131) was offered in the spring. We are planning to offer the new Circuit Analysis course (ENG GEN 220) in Spring 2019 and therefore expect spring enrollment to increase again.
Section offerings: See "Changes in enrollment" above.

FTEF: FTEF shows 0, but this is misleading. In every semester except Spring 2018 the full time engineering faculty has taught one or both ENG GEN courses.
Success and retention rates: The course retention and success rates do not show a changing trend. They met or exceeded the set rates in the last reported semester, Fall 2017.
Degrees and certificates awarded: The number of AS degrees in Pre-Engineering was 7 in 2016-17, which has increased for the last few years. The majority of students taking ENG GEN courses transfer, and the pre-engineering degree is not required. It is not required for transfer, and therefore most students do not obtain the degree, although most would qualify.

APP Section IV: Internal and External Influences Annual Program Plan: Version by **Cheung, Elizabeth** on **10/31/2018 21:08**

Briefly describe internal and external influenecs affecting the program/department

- Strong Workforce funds have recently been used to: purchase a new 3D printer, pay for a part time student worker to assist faculty and students with the equipment in the program (such as 3D printers). We are hoping to purchase workstation for the 3804 lab to improve the appearance and layout/functionality of the room.
- We are in the third and final year of our NSF ATE funded project called CAPTIVATE. This project has established "The Collaboratory," a hub for engaging students in multidisciplinary projects that address campus or community issues. We are exploring whether to apply for another grant in October 2019.
- We are a sub-grantee with CSUN on their USDoE AIMS^2 project. This grant has funded tutors in Physics, Engineering, and Computer Science, and has funded a CGCA to work with our STEM transfer counselor on activities targeted toward STEM transfer students.

APP Section V: Goals, Actions, Resource Requests and Justifications

Goals and Objectives			**Met**	**Not Met**
EGD TEK Goal 1: Increase access to 3D printing and other prototyping equipment in order to give students hands-on, project-based learning experiences.			Met	Not Met
Recommended Action	Designate a space on campus that can be used as a makerspace.	0 linked SLOs Resource Requests: • Makerspace - *(Status: Pending)*		
	Hire lab tech or instructional aid	0 linked SLOs Resource Requests: • Lab tech/instructional aid - *(Status: Pending)*		
	Purchase consumables such as 3D printer filament	0 linked SLOs Resource Requests: • Consumables budget - *(Status: Pending)*		
EGD TEK Goal 2: Increase access to computers with CAD software to enable students to perform CAD work outside of dedicated class time.			Met	Not Met
Recommended Action	Hire lab tech or instructional aid	0 linked SLOs Resource Requests: • Lab tech/instructional aid - *(Status: Pending)*		
	Purchase additional computers to run CAD/CAM software that can be accessed outside of regular class hours (in library, CAS, or another accessible location)	0 linked SLOs Resource Requests: • Computers - *(Status: Pending)*		
EGD TEK Goal 3: Establish Makerspace as an integral part of EG&DT program and campus life			Met	Not Met
Recommended Action	Designate a space on campus that can be used as a makerspace.	0 linked SLOs Resource Requests: • Makerspace - *(Status: Pending)*		
EGD TEK Goal 4: Increase students persisting in EG&DT courses			Met	Not Met
Recommended Action	Establish CTE counselor as permanent position	0 linked SLOs 0 resource requests		
	Create a low-unit certificate of achievement in Engineering Design & Technology	0 linked SLOs 0 resource requests		
EGD TEK Goal 5: Increase enrollment and success of underrepresented minorities in EG&DT (females, Hispanics)			Met	Not Met
Recommended Action	Faculty to attend PD workshops/conferences/etc focused on diversity and student success such as: Reading Apprenticeship, IWITTS, 3CSN events, FTLA, etc.	0 linked SLOs Resource Requests: • Professional development funds - *(Status: Pending)*		
	Establish CTE counselor as permanent position	0 linked SLOs 0 resource requests		
EGD TEK Goal 6: Explore articulations with local high schools			Met	Not Met

Goals and Objectives			Met	Not Met
Recommended Action	Work with HS outreach coordinator to establish articulations with HS	0 linked SLOs 0 resource requests		
EGD TEK Goal 7: Keep software current			Met	Not Met
Recommended Action	Keep SolidWorks, Autodesk software current by maintaining licenses and working with IT.	0 linked SLOs Resource Requests: • CAD/CAM software maintenance agreements - *(Status: Pending)*		
EGD TEK Goal 8: Develop a non-credit 3D printing course			Met	Not Met
EGD TEK Goal 9: Develop a non-credit Intro to CAD course			Met	Not Met
Engineering Goal 1: Develop a Materials Science & Engineering course			Met	Not Met
Engineering Goal 2: Develop a Matlab course			Met	Not Met
Industrial Technology Goal 1: Explore development of a Mechatronics program			Met	Not Met
Recommended Action	Meet with faculty from existing mechatronics programs to learn about and create curriculum	0 linked SLOs Resource Requests: • Faculty time - *(Status: Pending)*		
	Meet with industry representatives to learn about their needs and develop curriculum	0 linked SLOs 0 resource requests		
Industrial Technology Goal 2: Explore development of a Renewable Energy program			Met	Not Met
Recommended Action	Faculty to meet with PIs from Center for Renewable Energy and attend PD workshop such as CREATE's Summer Energy Educator Series. https://atecenters.org/eet/create/	0 linked SLOs Resource Requests: • Faculty time - *(Status: Pending)*		
	Meet with industry representatives to learn about their needs and develop appropriate program(s) and curriculum	0 linked SLOs Resource Requests: • Faculty time - *(Status: Pending)*		

APP Section VI: Additional Comments or Information