ALLAN HANCOCK COLLEGE

PROGRAM REVIEW

2017-2018

Program Name: Engineering Technology

Self Study Members:
Saad Sadig

PROGRAM REVIEW

ENGINEERING TECHNOLOGY

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ALLAN HANCOCK COLLEGE

Allan Hancock College Program Review

2017-2018 Comprehensive Self-Study

I. Program Mission *(must align with college mission statement)*

For all programs, describe the need that is met by the program or the purpose of the program, and explain how it aligns with the college mission and strategic plan. For CTEA programs only, show that "the program does not represent an unnecessary duplication of other vocational or occupational training programs in the area."

The Engineering Technology (ET) program is committed to providing students with the knowledge and skills they need to enter the engineering profession as beginning and/or intermediate CAD drafters and 3D modelers. In addition, the ET program is committed to preparing students to transfer to universities that offer degrees in mechanical engineering, industrial & manufacturing engineering, civil engineering, structural engineering, and other engineering related fields. Furthermore, the ET program is committed to meeting the needs of industry professionals by offering courses in technical drawing, design drafting applications, 2D modeling using AutoCAD, and 3D solid modeling using SOLIDWORKS.

There are two almost identical (A.S. & Certificate of Achievement) degrees requiring the same courses, one is Engineering Technology with emphasis on Mechatronics (see page 98 of 2017-18 catalog) and the other Electronics Technology: Mechatronics (see page 94 of 2017-18 catalog).

II. Progress Made Toward Past Program/Departmental Goals

Summarize the progress the discipline has made toward achieving its goals during the past six years. Discuss briefly the quality, effectiveness, strengths and struggles of the program and the impact on student success as reflected in past comprehensive program reviews and annual updates.

Quality

- Up-to-date drafting software including AutoCAD 2017 and SOLIDWORKS.
- Two adjunct faculty members with extensive experience in CAD drafting and solid modeling. One faculty member currently works for Atlas Copco Mafi Trench Company as a CAD drafting manager, the second currently works for Vandenberg Air Force Base as a CAD drafter.
- A 3D printer was purchased to generate prototypes of machine parts. Making prototypes can greatly enhance students' understanding of machine components and their assemblies.

Effectiveness

- Over the past several years, many internship opportunities were provided at Atlas Copco Mafi-Trench Company (website: http://www.atlascopco.us/en-us) with the assistance of Engineering Technology part time instructor Tim Breschini, who has been with the company for over 20 years. Many students were able to secure internships as well as employment.
- Contact has been initiated with the Project Director of K-12 partnerships, CWE, career

development, to explore college credit opportunities for those working in a paid or unpaid internships within their major.

- A valuable professional development opportunity was provided in the fall of 2016. Support was provided to one ET part time instructor to attend a meeting to discuss the development of C-ID descriptors to support local associate degrees and certificates, specific to ET.
- There is a need to create more opportunities with professional engineering companies in the fields of manufacturing, mechanical, industrial and civil engineering.
- Effort is ongoing to collaborate with the library to provide up-to-date technical drawing, 2D modeling, and 3D solid modeling resources and references.
- There is an opportunity to establish articulation with universities that offer engineering degrees. For example, Cal Poly has several engineering programs including, civil, industrial & manufacturing, and mechanical
- Existing ET courses fulfill the Engineering Technology AS degree requirements as well as the engineering drafting certificate.
- ET courses specific to civil engineering technology including courses in civil engineering technology, civil engineering drafting, Geographic Information Systems GIS, and plane surveying, need to be added to the curriculum.
- A collaborative effort between ET and Electronics is needed to review the effectiveness and relevance of the ET Mechatronics AS degree track.

Strengths

The program has:

- A 32-station CAD lab with up-to-date drafting software including AutoCAD and SOLIDWORKS.
- A 3D printer to generate prototypes of machine parts.
- An e-printer that helped increase the speed and efficiency of the printing process.
- Part time instructors who are connected to the industry.

Struggles

- ET 100 is outperforming ET 140 and ET 145 in both the efficiency and fill rates. Professional feedback from industry as well as outreach efforts are both needed to increase awareness of the program and to attract more students and professionals to the advanced courses.
- In order to increase awareness of careers and opportunities in engineering drafting technology a more rigorous outreach effort is necessary. In such outreach activities, experts are needed to assist with providing information about entry-level technical drawing skills, industry trends, job outlook, current 2D CAD drafting and 3D modeling technologies.
- There are insufficient classrooms to accommodate the many courses required to obtain the following program degrees and certificate:

a) Engineering Technology — Associate in Science Degree
b) Engineering Technology: Civil Engineering — Associate in Science Degree
c) Engineering Technology with Emphasis on Mechatronics — Associate in Science Degree
d) Engineering Drafting — Certificate

- Missing courses that specifically cover civil engineering drafting, plane surveying, GIS, hydraulics, material strength testing laboratory (concrete and steel) are needed.
- Lack of qualified and available civil engineering faculty.
- Lack of CAD lab space to offer additional CAD drafting including civil engineering drafting.
- Forming an Engineering Technology advisory committee is necessary for establishing the much needed connection between the ET program and the engineering/manufacturing industries.

- There is a need to determine the appropriate title of the currently labeled ET program. According to the California Community Colleges Taxonomy of Programs. February 2004. 6th Edition at the address: http://extranet.cccco.edu/Portals/1/AA/Credit/2013Files/TOPmanual6_2009_09corrected_12.5.13.pdf The following definition of Drafting Technology (TOP code 0953.00) is given: *Planning, preparation, and interpretation of various engineering sketches for design and drafting duties, for circuits, machines, structures, weldments, or architectural plans. Includes the application of advanced computer software and hardware (Computer Assisted Drafting and Computer Assisted Design) to the creation of graphic representations and simulations in support of engineering projects.*

  The description of Engineering Technology, General TOP Code 0924.00 (requires Trigonometry) is:
  Technical support of engineering, including the use of civil and mechanical engineering principles, physical sciences, basic physics, mathematics, surveying, materials testing, hydraulics and pneumatics, and the preparation of plans, specifications, and engineering reports.

III. Analysis of Resource Use and Program Implementation

Describe the program's current allocation and use of human, physical, technology, and fiscal resources. Are resources sufficient and appropriate to meet program needs? Can program resources be reallocated to better meet student needs? If so, how?

Human Resources:

The Engineering Technology program currently has two part time instructors teaching a total of seven ET courses per year. In addition, instructors from the Machine Technology program teach two cross-listed ET courses, showing the need for additional instructors to teach needed new courses in civil engineering technology.

Physical Resources:

- A single CAD lab is shared between the architecture and the ET program. An average of six CAD classes are taught per week each semester. As a result, the CAD lab lacks the capacity to accommodate additional course sections unless courses are offered on Fridays and Saturdays.
- Additional courses in civil engineering including plane surveying, strength of materials lab, GIS, hydraulics, and transportation/highway plan reading will require additional lab and classroom space.

Technology:

- The latest technology in plane surveying relies on a "Total Station," which is a modern surveying instrument that integrates an electronic theodolite with an electronic distance meter. A theodolite uses a movable telescope to measure angles in both the horizontal and vertical planes. This instrument is necessary for the instruction of plane surveying, which is currently not being utilized.
- Currently, Autodesk is a software provider of that offers free educational CAD software for several programs. This opportunity will allow the ET program to obtain civil engineering drafting software, AutoCAD 3D Civil. This program will be needed when a civil engineering drafting course is developed.

IV. Program SLOs/Assessment

What are your program student learning outcomes? Have each of these been assessed since the

last comprehensive program review? Describe changes you have made to courses or the program based on these data.

The following are ET program learning outcomes:

ET CIVIL:

1. Develop familiarity with the components, materials, types, and methods of building construction; terminology as applied to codes, foundations, concrete, light frame wood, heavy timber, soils, and the structural elements.
2. Become familiar with the origin, nature and application of the fundamental concepts and principles of physics and its application to the field of civil engineering technology.
3. Become familiar with the principles of physical geology including the identification of rocks and minerals.
4. Be able to interpret topographical and geological maps.
5. Become familiar with land forms and structures.
6. Become familiar with force systems and equilibrium condition and develop the ability to use these principles to solve engineering problems.

Comments:
None of the above program learning outcomes can be assessed at this time due to the absence of ET courses that specifically address the topics above. Currently, the ET Civil program consists of support courses including physics, geology, and architecture. As a result, courses that specifically cover civil engineering technology need to be developed. Challenges include the lack of CAD lab space because the CAD lab is filled with architecture and ET courses.

ET MECHATRONICS

1. Demonstrate a fundamental mastery of knowledge and the use of electronic equipment in electrical, digital and analog circuits.
2. Use computer simulation and design software to conduct, analyze and interpret electrical, digital and analog circuits.
3. Make calculations involving various electrical laws, formulas, and principles for predicting circuit parameters using algebra and trigonometry required for electronics.
4. Use research strategies to acquire information pertinent to the solution of electronic circuits and systems.
5. Write technical laboratory reports with conclusions.
6. Demonstrate learned skills with a capstone project requiring you to design, build and evaluate a piece of electronic equipment.
7. Apply current knowledge and adapt to emerging applications of automation and control.

Comments:
None of the above program learning outcomes can be assessed at this time due to the absence of ET courses that specifically address the topics above. Currently, the ET Mechatronics program consists of electronics courses that are cross-listed as ET, and support courses in welding and machine technology. There are two almost identical (A.S. & Certificate of Achievement) degrees requiring the same courses, one is Engineering Technology with emphasis on Mechatronics (see page 98 of 2017-18 catalog) and the other Electronics Technology: Mechatronics (see page 94 of 2017-18 catalog).

ET DRAFTING

1. Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions.
2. Develop the ability to read engineering drawings and specifications.
3. Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.

ET GENERAL

1. Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development.
2. Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings.
3. Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric dimensioning and tolerancing, threads, and fasteners.

Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies.

VI. Success, Retention, and Equity

Describe how the program works to promote student success. Include teaching innovations, use of academic and student support services (library, counseling, LAP, community partnerships, etc.). Refer to list of Student Services.

Promoting student success:

The promotion of student success continues to be an important goal of ET program. Successes include gaining the necessary skills to meet new challenges at work, earning an associate degree/certificate, working towards transferring to engineering programs at universities, or simply gaining new skills to facilitate a career change. Regardless of the success path, the ET program strives to work with each student on strategies to reach his/her goals. The ET program offers courses in AutoCAD, SOLIDWORKS, and print reading & interpretation. Gaining skills in these areas is essential for success as entry level drafters.

In addition, the ET program promotes student success through the participation in competitions such as Skills USA, which is a national organization for students in trade, industrial, technical and health occupations education. The organization holds competitions annually to recognize the achievements of career and technical education students and to encourage them to strive for excellence. In order to qualify for the state level competition, students are required to first medal at a Skills USA regional competition. Wyatt Allen, an Allan Hancock College student who enrolled in several ET classes, brought home gold at the April 2017 SkillsUSA statewide competition in the technical drafting category, which requires students to compose drawings that visually communicate how something functions or is to be constructed. "I have loved art and design for years, almost as long as I've loved engineering. It's a cool combination of all three of my passions," Allen said.

With his first place finish, Allen advanced to the next level of competition at the 52nd annual SkillsUSA National Championships in Louisville, Kentucky, June 22-23, 2017. More than 6,000 career and technical education students, all state contest winners, competed. The championships occupied a space equivalent to nearly 20 football fields. Allen won the bronze medal in technical

drafting nationally.

Connection between the ET program and student support services:
There is a need to strengthen the connection between the ET program and student support services. Currently, the library contains outdated materials on engineering technology as well as on computer aided drafting technology. Because of the rapid change in drafting and design technology, information tends to become obsolete in a short period of time. The ET program needs to work closely with the library by sharing up-to-date information about engineering technology and professional practice. In addition, more information sharing and collaboration is needed between the ET program and the counseling department. More specifically, this would include information about proper course sequencing, transfer options, minimum knowledge and skills needed for entry-level jobs in engineering drafting, career pathways, and associated labor market information and data.

The Math Center, STEM Center, Career/Job Placement Center, EOPS/CalWORKS, CAN/TRIO, and LRC Tutoring Center offer student support services that ET students may utilize to enhance success.

- *Then, utilizing data from the office of Institutional Research and Planning, report on student success through course completion and retention data. Analyze, by discipline, success by gender, age, ethnicity, and online (may analyze other variables such as disability, English as a second language, day vs. night courses, etc. as appropriate).*
- *Suggest possible reasons for these trends and planned actions to address any disproportionate impact.*

The data below shows the high retention rates for the period 2011-2016. Retention rates range from a low of 84.62% in the fall of 2014 to a high of 98.18% in the spring of 2013. The above data also shows success rates ranging from a low of 69.23% in the fall of 2014, six course sections were offered, to a high of 94.55% in the spring of 2013 when four course sections were offered. Overall, the ET program has managed to keep both high and stable retention and success rates.

Summer 2011, Fall 2011, Spring 2012 and 14 more ET Outcomes

	Summer 2011	Fall 2011	Spring 2012	Summer 2012	Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014	Summer 2014	Fall 2014	Spring 2015	Summer 2015	Fall 2015	Spring 2016	Summer 2016	Fall 2016
Sections	1.00	3.00	3.00	1.00	5.00	4.00	1.00	5.00	4.00	1.00	6.00	4.00	1.00	5.00	4.00	1.00	5.00
Headcount	15.00	52.00	39.00	17.00	41.00	46.00	17.00	51.00	43.00	25.00	57.00	48.00	26.00	56.00	45.00	19.00	49.00
Enrollment	15.00	52.00	39.00	17.00	41.00	55.00	17.00	57.00	47.00	25.00	65.00	52.00	26.00	66.00	46.00	23.00	50.00
retained	14.00	47.00	35.00	16.00	39.00	54.00	16.00	53.00	43.00	25.00	55.00	48.00	25.00	59.00	44.00	23.00	48.00
Retention %	93.33%	90.38%	89.74%	94.12%	95.12%	98.18%	94.12%	92.98%	91.49%	######	84.62%	92.31%	96.15%	89.39%	95.65%	######	96.00%
success	14.00	44.00	31.00	16.00	35.00	52.00	15.00	50.00	37.00	25.00	45.00	41.00	24.00	54.00	41.00	23.00	46.00
Success %	93.33%	84.62%	79.49%	94.12%	85.37%	94.55%	88.24%	87.72%	78.72%	######	69.23%	78.85%	92.31%	81.82%	89.13%	######	92.00%
FTES	2.50	9.63	5.66	2.95	7.54	8.75	2.83	10.46	8.05	4.34	10.96	8.85	4.52	10.82	8.09	3.83	9.14

Summer 2011, Fall 2011, Spring 2012 and 14 more Retention & Success

Click on course name to get retention/success by course demographics

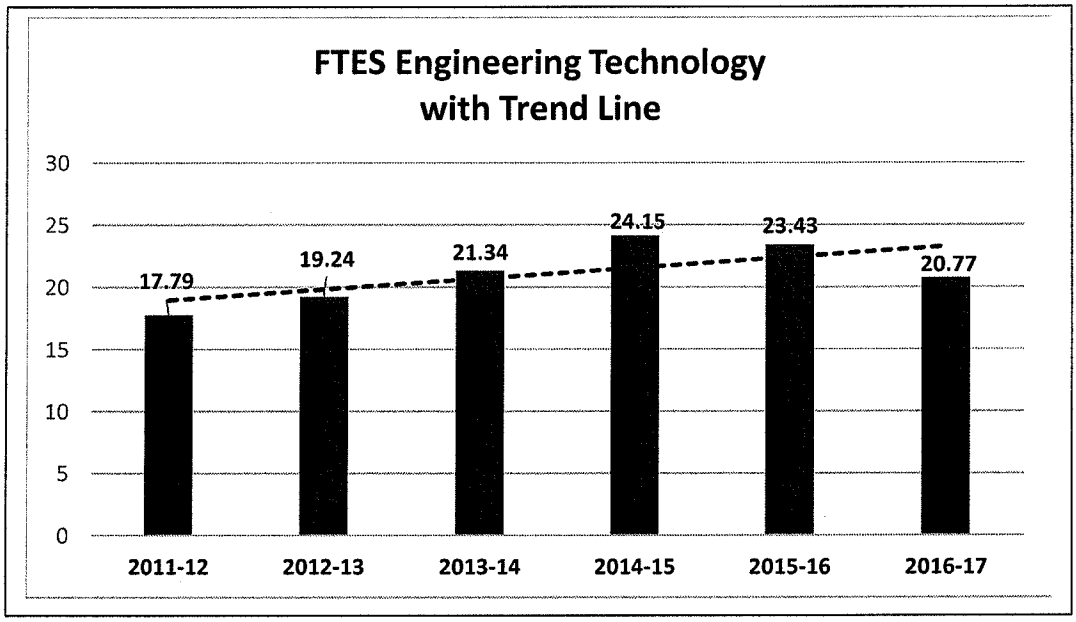
	Summer..	Fall 2011	Spring 2..	Summer..	Fall 2012	Spring 2..	Summer..	Fall 2013	Spring 2..	Summer..	Fall 2014	Spring 2..	Summer..	Fall 2015	Spring 2..	Summer..	Fall 2016
course																	
ET100																	
ET117																	
ET140																	
ET145																	
ET160																	
ET189																	
ET300																	
ET330																	
ET381																	
Grand Total																	

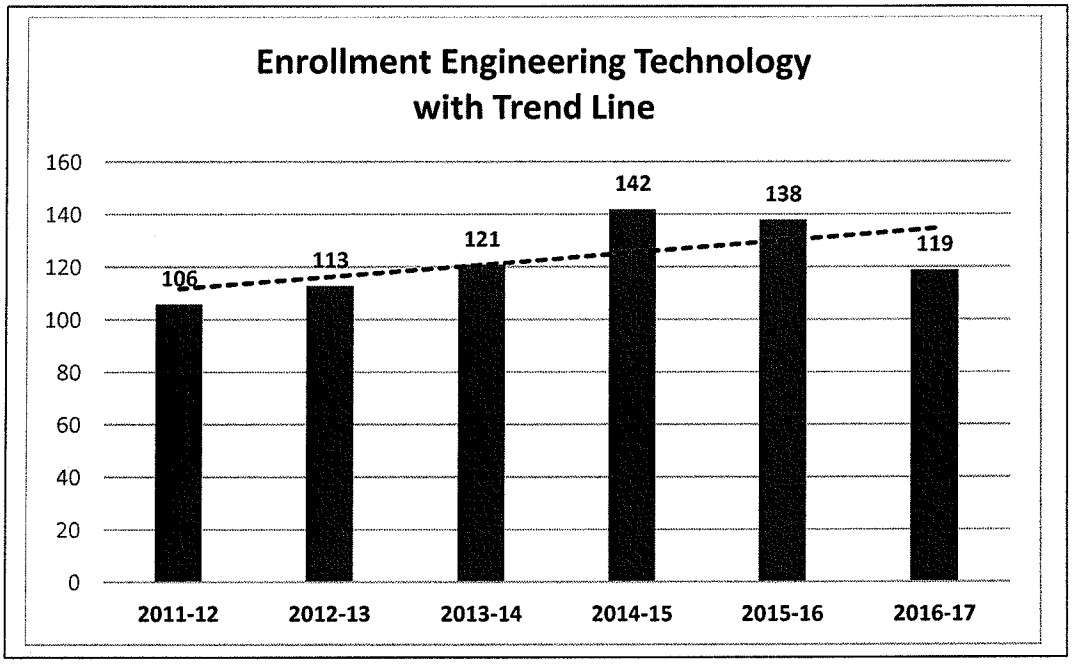
VII. Trend Analyses/Outlook

Using the information already gathered in the Annual Updates s (e.g., enrollment and achievement data; student learning outcomes assessment and analysis; input by advisory boards; existing articulation agreements; labor market trends) summarize the major trends, challenges, and opportunities that have emerged in the program since the last comprehensive program review. Explain possible causes for any identified gaps or trends and actions taken or needed to address these.

Enrollment trend, general:

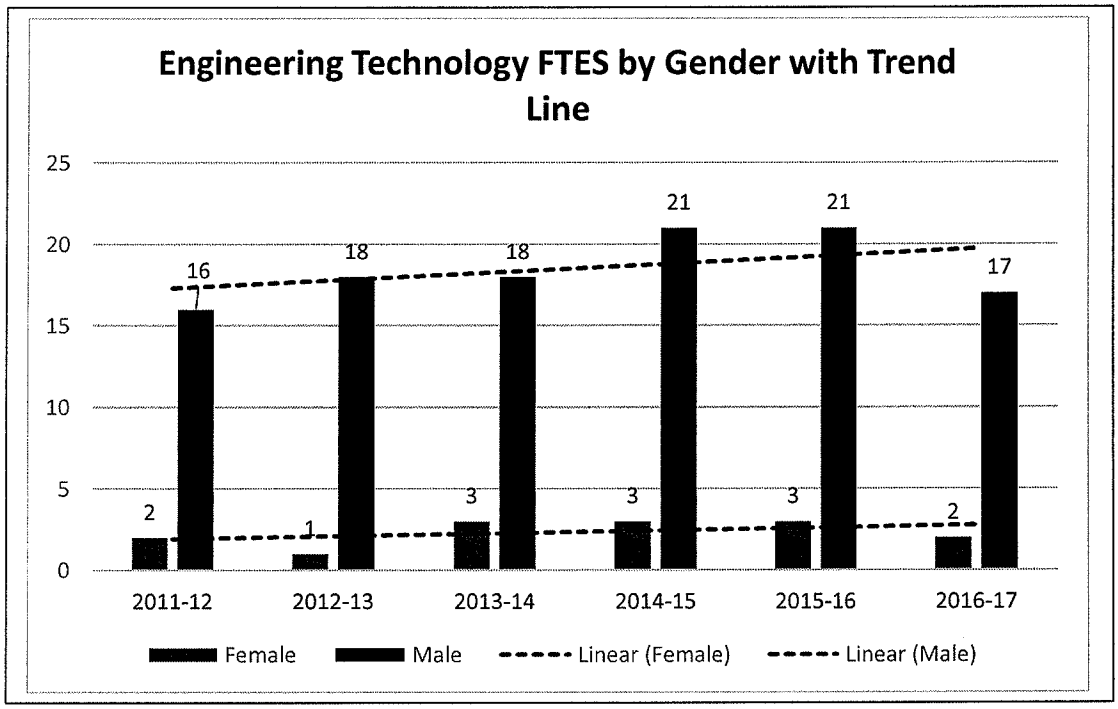
The graph below shows the ET program's FTES from 2011 to 2017. FTES values increased consecutively between 2011 and 2015, reaching a maximum of 24.15 in 2014-15. Similarly ET enrolment increased consecutively from 2011 to 2015 reaching a maximum of 142 in 2014-15. Enrollment decreased by a small margin in 2015-16 to 138 and then decreased further in 2016-17 to 119 (see bottom graph below). Despite the reduction in enrollment in the last two years, the trend line slope remains positive indicating an overall increasing enrolment trend. The fall 2017 enrollment numbers have exceeded fall 2016 numbers. This increase in enrollment as well as the projected strong enrollment in the spring of 2018 is expected to reverse the negative trend over the past 3 years.

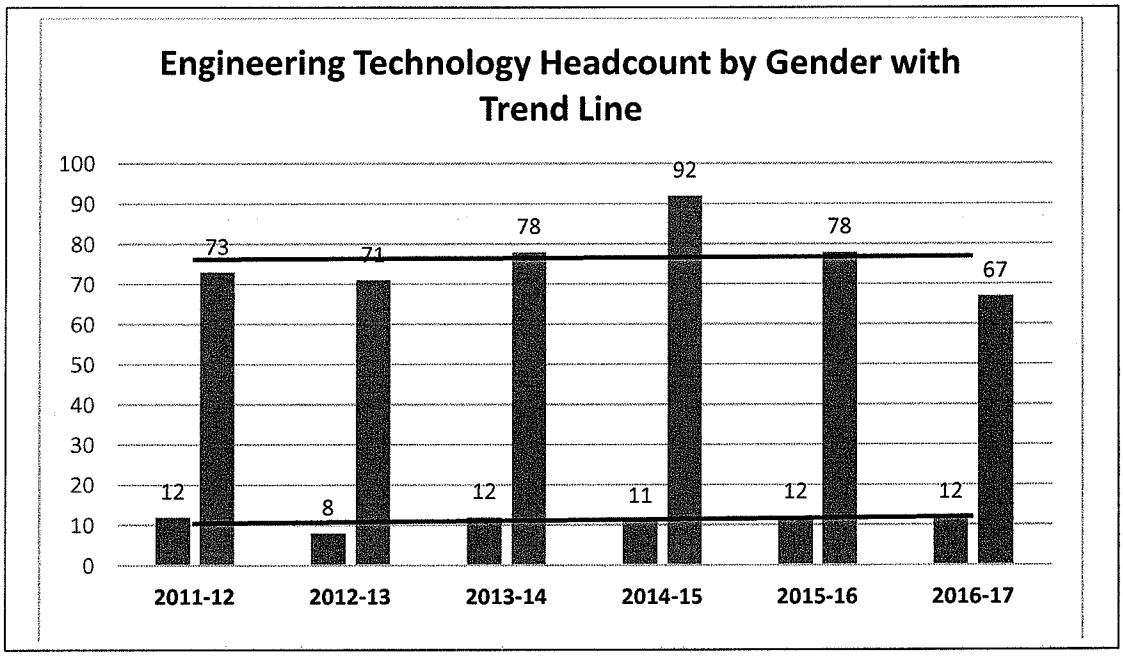




Enrollment and FTES trends by gender:

The graphs below compare both the ET FTES and head count by gender over the course of six years. The % female FTES to total FTES reached a maximum of 3/21 or 14.3% in the 2013-14. In addition, there is a consistent large gap between the number of females and males enrolled in the ET program. This data reinforces the need to market the ET program to recruit more female students. The fields of engineering and engineering technology continue to be male-dominated. Consequently, a primary goal of the ET program is to empower women to pursue both education and careers in engineering and engineering technology.





Enrollment trend by age category:

ET: DEMOGRAPHICS

subject_code
ET

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
age_category	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
Under 19	23	5	23	6	17	4	30	7	19	4	20	4
20-24	31	6	29	7	36	8	31	8	40	10	33	9
25-29	12	3	7	3	15	4	20	5	17	5	9	3
30-34	4	1	8	2	10	2	8	2	5	2	4	1
35-39	5	1	4	1	2	1	6	2	7	1	5	1
40-49	6	1	4	1	7	2	5	0	5	1	6	1
50+	5	1	5	1	5	1	5	1	1	0	5	1

The above table shows that the majority of students make up the under 25 category. This situation is not unusual given that a dominant number of students attend community college immediately after graduating from high school or within a few years after graduation. A percentage of those who attend college are often uncertain about their career choices. As a result, many students explore various courses and subjects to determine if the course or the subject chosen will spark their long-term interests. A few students may invest several semesters exploring options before finally settling on a major. Collaboration between counseling, ET and campus-wide implementation of the Guided Pathways initiative can help undecided students make more informed educational and career choices.

Enrollment trend by ethnicity:

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
ETHNICITY	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
Asian	2	0	1	0	4	1	3	1	3	1	1	0
Black	1	0					1	0	1	0	1	0
Filipino	3	1	6	2	2	0	4	1	3	1	2	0
Hispanic	42	8	45	11	45	11	60	14	44	11	37	9
Native Am	1	0	1	0	1	0	1	0	2	1	2	0
Pac Isl	1	0									1	0
Unknown											1	0
White	35	8	26	6	38	9	35	8	37	10	34	9

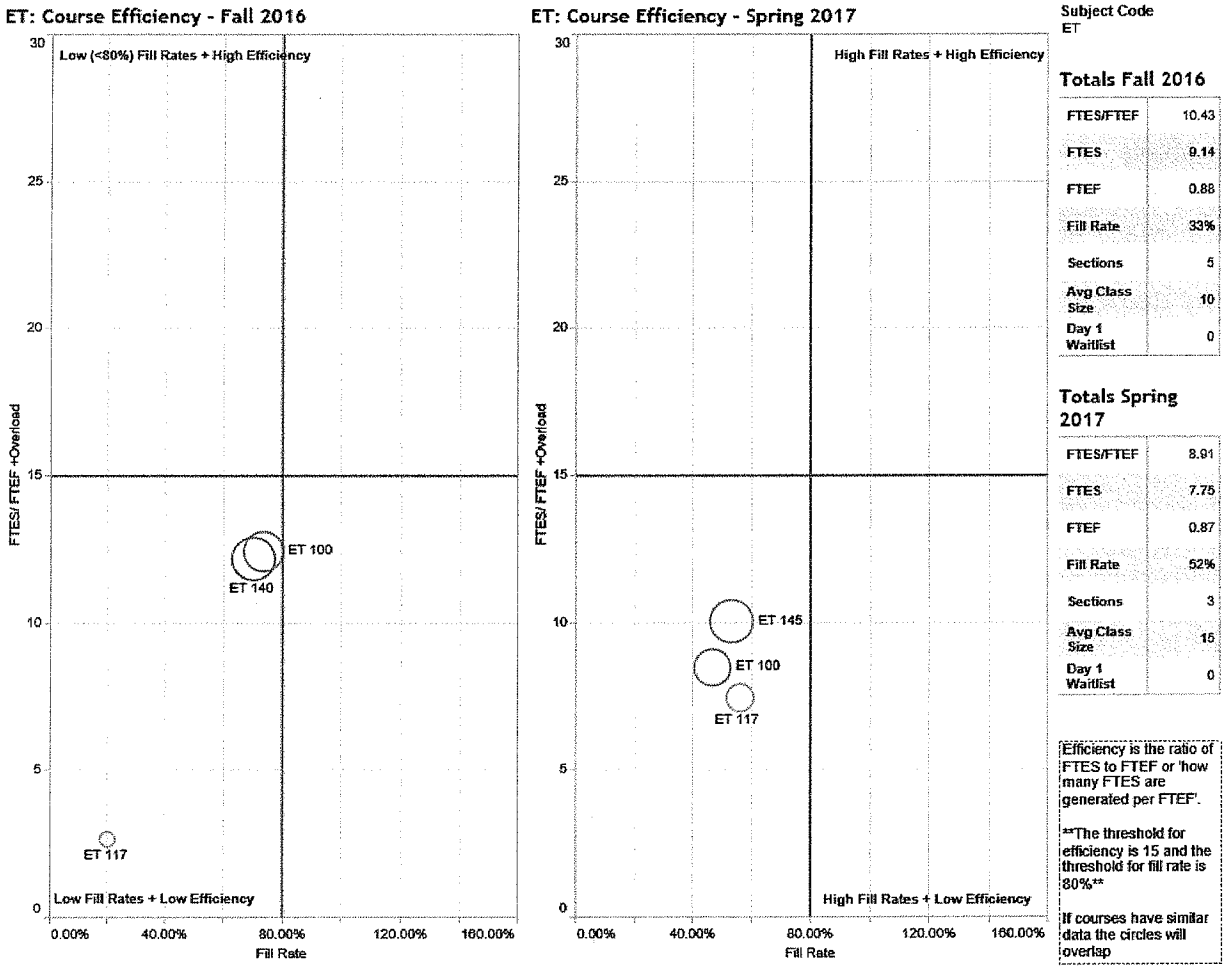
The table above compares the ET program headcount data of various ethnic groups. In 2016-17 a headcount of 37 was recorded for Hispanic students which was 46.8% of the total headcount of 79 (see right table). This is consistent with the 2016-17 college data on ethnicity where Hispanic student headcount was 8,206 which is 47.6% of the college headcount of 17,236. In addition to continuing to encourage Hispanic students to pursue education and training in ET and related fields, there is a need to educate students from other ethnic groups about career opportunities, and the higher-than-average earning potential for those who have associate degrees.

	AHC	ET
	2016-17	
Asian	512	1
Black	583	1
Filipino	483	2
Hispanic	**8206**	**37**
Native Am	307	2
Other	4	0
Pac Islander	119	1
Unknown	6	1
White	7016	34
TOTAL	**17236**	**79**

Efficiency and Fill Rates for ET 117 and ET 160

The graph below shows the fill and efficiency rates for ET 100, 117, 140, 145 for fall 2016 and spring 2017. The low fill rate and efficiency rate for ET 117 is due to other cross-listed courses not accounted for, including AB 117, AT 117, and MT 117. This semester, the combined AB, AT, ET, and MT 117 course shows an enrollment of 23 out of the maximum enrollment of 25, which represents a 92% fill rate.

Similar to ET 117, the fill rate for ET 160 does not reflect the actual fill rate of the course. ET 160 is cross listed with Arch 160 and the crossing listing condition must be accounted for.



ET: Course Efficiency

AcademicYear	Term Code - Desc	Division Desc	Subject Code	course	Max. Lab Sessions	FTES/FTEF	FTES	FTEF	Enrollment	Max Enrollment	Fill Rate	Day 1 Waitlist	Demand Ratio
2016-2017	Summer 2016	Industrial Technology	ET	ET 100	1.0	12.39	3.83	0.31	23.0	32.0	72%	0.0	72%
				Total	1.0	12.39	3.83	0.31	23.0	32.0	72%	0.0	72%
	Fall 2016	Industrial Technology	ET	ET 100	1.0	12.45	3.85	0.31	22.0	30.0	73%	0.0	73%
				ET 117	0.0	2.67	0.53	0.20	5.0	25.0	20%	0.0	20%
				ET 140	1.0	12.20	4.49	0.37	21.0	30.0	70%	0.0	70%
				ET 160	1.0		0.17	0.00	1.0	32.0	3%	0.0	3%
				ET 300	0.0		0.11	0.00	1.0	35.0	3%	0.0	3%
				Total	1.0	10.43	9.14	0.88	50.0	152.0	33%	0.0	33%
	Spring 2017	Industrial Technology	ET	ET 100	1.0	8.49	2.62	0.31	15.0	32.0	47%	0.0	47%
				ET 117	0.0	7.48	1.50	0.20	14.0	25.0	56%	0.0	56%
				ET 145	1.0	10.06	3.63	0.36	17.0	32.0	53%	0.0	53%
				Total	1.0	8.91	7.75	0.87	46.0	89.0	52%	0.0	52%
Grand Total					1.0	10.08	20.73	2.06	119.0	273.0	44%	0.0	44%

The table above shows ET course efficiency information including enrollment, fill rates and efficiency rates.

More data is available at:
http://research.hancockcollege.edu/student_learning_outcomes/documents/ET_data_17-18.pdf

Challenges:

- Missing courses that specifically cover civil engineering technology including AutoCAD 3D Civil, plane surveying, construction material testing including concrete and steel, transportation, and Geographic Information Systems (GIS).
- Insufficient classrooms to accommodate the many courses required to obtain the ET program degrees and certificate.
- Lack of qualified and available faculty to teach civil engineering technology.

Opportunities:

- The ET civil engineering track can be strengthened by adding courses in AutoCAD 3D Civil, plane surveying, material testing, transportation, and Geographic Information Systems (GIS).
- Better transfer opportunities can be created to help students successfully transition to a university program in civil engineering manufacturing engineering, and mechanical engineering.

As applicable, please address the breadth, depth, currency, and cohesiveness of the curriculum in relation to evolving employer needs and/or transfer requirements, as well as other important pedagogical or technology-related developments and actions taken or needed to address these.

Current courses in mechanical drafting technology continue to be effective in meeting the needs of employers in the mechanical engineering field. There is a need to add courses that help students meet the minimum entry-level skills of civil engineering drafters. Civil engineering is a broad field which includes transportation, plane surveying, civil engineering drafting, geographic information systems, hydraulics, and structural engineering.

VIII. Long-Term Program Goals and Action Plans (Aligned With the College Educational Master Plan)

Describe the long-term plans for changing or developing new courses and programs, other actions being taken to enhance student success, and the need for professional development activities and other resources to implement program goals. Be sure to show how these plans are related to assessment results. (Plan should cover five-year period and include target dates and resources needed.)

1. Enhance the ET Civil track by developing the following new courses:
   - Plane Surveying
   - Geographic Information Systems (GIS)
   - AutoCAD 3D Civil
   - Strength of Materials lab
   - Transportation and Highway Plan Reading
   - Hydraulics

   The above courses can substantially enhance the quality of the ET Civil track. However, the limitation of facilities will have an impact of the extent of the program expansion. (See Exhibit for examples of community college civil engineering technology courses.

2. Form an Engineering Technology advisory committee to identify new technologies, current engineering practices, and job outlook.
3. Collaborate with related disciplines within the industrial technology program including architecture, machine technology and welding. Collaboration opportunities includes participation in the annual Cal Poly Design Village competition and in the annual Skills USA competition.
4. Collaborate with the engineering program to identify opportunities for ET Civil Engineering program improvement. In addition, look for opportunities to join forces with civil engineering and structural engineering university programs at Cal Poly and at other universities.
5. Introduce up-to-date civil engineering technology equipment including a "Total Station" for plane surveying and acquiring additional 3D printers for prototyping, as necessary, in consultation with the MT program.
6. Work with civil engineering related organizations including California Department of Transportation (Caltrans) on creating internship opportunities.

CCCCO Labor Market Demand and Supply Data | Engineering Tech + Drafting Tech

The tables below shows labor demand and supply for the Central Coast Tri-County Region: This information was obtained by using the CCCCO's own labor market demand and supply data tools.

DEMAND: cumulative demand for all SOC codes listed = 99 annual openings

SOC Codes for graphic designers and interior designers were added due to the similarity between job duties performed by graphic designers and interior designers to those performed by technical illustrators. Both graphic design and interior design rely on technical skills in CADD, CATIA, SignCAD, Adobe InDesign, Photoshop, Illustrator in addition to Revit, and Vectorworks.

SUPPLY: cumulative workforce supply from community colleges and other comparable adult educational institutions = 49 average annual graduates/completers

The above data tools are what the CCCCO includes as resources for Strong Workforce Program LMI.

SOC Code	Occupational Title	Typical Entry Level	2015 Jobs	2018 Jobs	2015-18 Change	% Change 2015-18	Openings (New + Replace-ments)	Annual Openings	10% Hourly Earnings	Median Hourly Earnings
17-3011	Architectural and Civil Drafters	Associate degree	492	479	(12)	(2.5%)	23	8	$17.63	$23.84
17-3013	Mechanical Drafters	Associate degree	258	253	(5)	(2.0%)	10	3	$17.07	$27.09
17-3019	Drafters, All Other	Associate degree	82	81	(1)	(1.0%)	1	0	$18.15	$27.60
17-3022	Civil Engineering Technicians	Associate degree	320	325	5	1.5%	33	11	$18.82	$30.77
17-3027	Mechanical Engineering Technicians	Associate degree	278	271	(6)	(2.2%)	21	7	$15.39	$22.68
17-3031	Surveying and Mapping Technicians	HS diploma or equivalent	188	187	(2)	(0.8%)	11	4	$15.04	$20.53
27-1021	Commercial and Industrial Designers	Bachelor's degree	224	223	(1)	(0.4%)	19	6	$16.92	$25.69
27-1024	Graphic Designers	Bachelor's degree	1,581	1,582	1	0.1%	129	43	$14.46	$19.86
27-1025	Interior Designers	Bachelor's degree	531	538	7	1.3%	50	17	$15.92	$21.49
Grand Total			3,954	3,940	(14)	(0.4%)	297	99	$15.88	$22.65

The data above shows eight annual opening for architectural and civil drafters. This demand is not met by an equal supply of program graduates in architectural and civil engineering drafting. In addition, civil engineering drafting instruction continues to need enhancement by offering CAD drafting courses related to civil engineering, more specifically AutoCAD Civil 3D. The data above also shows three annual openings for mechanical drafters. Currently Ventura is producing a three-year average of three mechanical drafting associate degree holders as well as three mechanical drafting certificate holders. The ET program does not currently have a mechanical engineering drafting certificates which would fall under drafting technology mechanical top code: 095340.

For more detail, click on the "+"			Note: Preliminary data for Other Ed. Institutes - its may change	Note: Preliminary data for Community Colleges - its may change	
TOP6 - Program Title	2012-13	2013-14	2014-15	2015-16	Latest 3 Yr Avg
092400 - Engineering Technology, General (requires Trigonometry)					
Allan Hancock					
Associate Degree		2	1	1	1
Allan Hancock Total		2	1	1	1
Ventura					
Associate Degree		1	1	2	1
Certificate 30 to < 60 semester units		-	1	2	1
Ventura Total		1	2	4	2
092400 - Engineering Technology, General (requires Trigonometry) Total		3	3	5	4
095300 - Drafting Technology					
Ventura Adult and Continuing Education					
Award < 1 academic yr	5	4	2		4
Ventura Adult and Continuing Education Total	5	4	2		4
ITT Technical Institute-Oxnard					
Associate Degree	8	11	16		12
ITT Technical Institute-Oxnard Total	8	11	16		12
Santa Barbara		5	9	7	7
Ventura					
Associate Degree		-	-	2	1
Certificate 18 to < 30 semester units		-	-	2	1
Ventura Total		-	-	4	1
095300 - Drafting Technology Total	13	20	27	11	24
095310 - Architectural Drafting					
Allan Hancock					
Associate Degree		1	2	1	1
Allan Hancock Total		1	2	1	1
Moorpark					
Certificate 18 to < 30 semester units		-	-	-	-
Moorpark Total		-	-	-	-
095310 - Architectural Drafting Total		1	2	1	1
095330 - Electrical, Electronic, and Electro-Mechanical Drafting					
Ventura Adult and Continuing Education					
Award 1 < 2 academic yrs	10	19	14		14
Ventura Adult and Continuing Education Total	10	19	14		14
095330 - Electrical, Electronic, and Electro-Mechanical Drafting	10	19	14		14
095340 - Mechanical Drafting					
Ventura					
Associate Degree		5	3	2	3
Certificate 18 to < 30 semester units		2	4	3	3
Ventura Total		7	7	5	6
095340 - Mechanical Drafting Total		7	7	5	6
Grand Total	23	50	53	22	49

Recommendations based on supply and demand data:

1. Facilitate the obtainment of more associate degrees in engineering technology by reviewing the current list of required core courses.
2. Assess the need for General Physics and Fundamentals of Programming as required core courses in ET.
3. Facilitate the obtainment of more engineering drafting certificates.

ASSESSMENT PLAN

ASSESSMENT PLAN

The table below shows the six year assessment cycle for ET courses:

Course	Course SLO's	To be Assessed in: Semester	Assessment Method(s)	Team to Review Assessment Results	Resources Needed to Conduct Assessment	Individual Responsible for Assessment Report
ET 100	1. Demonstrate proficiency in applying visualization techniques.	Spring 2018	Projects	Program SLO's coordinator	None	Instructor of record for that semester
	2.Apply basic and advance AutoCAD drawing techniques to create objects.	Summer 2018	Lab Activities			
	3.Apply basic and advance AutoCAD editing techniques to modify objects.	Fall 2019	Lab Activities			
	4. Annotate drawings accurately including adding text, working with tables, and dimensioning drawings.	Spring 2020	Projects			
	5. Set up paper space layouts for plotting using industry standard techniques, including multiple layouts and multiple scale viewports.	Summer 2020	Projects			

Course	Course SLO's	To be Assessed in: Semester	Assessment Method(s)	Team to Review Assessment Results	Resources Needed to Conduct Assessment	Individual Responsible for Assessment Report
ET 117	1. Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	Spring 2018	Projects	Program SLO's coordinator	None	Instructor of record for that semester
	2.Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	Fall 2018	Exams			
	3.Use an engineering drawing accompanying specifications and materials list to solve industrial questions, to complete a project, or solve a related problem.	Spring 2019	Projects			
	4. Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	Fall 2019	Projects			
	5. Be able to read engineering drawings that have multi-views and auxiliary views. Understand multi-view projections. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	Spring 2020	Exam			
	6. Read and interpret drawings with fasteners and weld symbols. Be able to read prints with cam, gear, and bearing details.	Fall 2020	Projects			
	7.Read and interpret general dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	Spring 2021	Exams			

Course	Course SLO's	To be Assessed in: Semester	Assessment Method(s)	Team to Review Assessment Results	Resources Needed to Conduct Assessment	Individual Responsible for Assessment Report
ET 140	1. Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.	Fall 2018	Quiz	Program SLO's coordinator	None	Instructor of record for that semester
	2. Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.	Fall 2019	Projects			
	3. Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.	Fall 2020	Projects			
	4. Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.	Fall 2021	Exams			
	5. Develop the understanding of geometric dimensioning and tolerancing. Understand symbols and application.	Fall 2022	Exams			
	6. Create an assembly drawing project to completion. To include creation of a bill of material.	Fall 2023	Projects			
	7. Use a 3D CADD program to create simple 3D models.	Fall 2024	Projects			

Course	Course SLO's	To be Assessed in: Semester	Assessment Method(s)	Team to Review Assessment Results	Resources Needed to Conduct Assessment	Individual Responsible for Assessment Report
ET 145	1. Develop advanced compilation skills required to complete an engineering drawing. Compile data such as heat treatment, non- destructive testing, material specification, etc. and incorporate into an advanced engineering drawing.	Spring 2018	Projects	Program SLO's coordinator	None	Instructor of record for that semester
	2. Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete and advanced engineering drawings. CADD Software to include both 2D & 3D.	Spring 2019	Lab Activities			
	3. Obtain and apply all necessary drawing planning skills so at to plan and outline the steps to complete an involved project on a CADD system. Drawing planning to include title and tolerance blocks, notations, multi view drawing set-up and complete dimensioning, both general and advanced geometric dimensioning and tolerancing.	Spring 2020	Exam			
	4. Use advanced CADD skills to produce 2D and 3D engineering drawings. 3D drawings to include use of assembly tools such as mates to construct 3D assemblies.	Spring 2021	Projects			
	5. Apply advanced general and geometric tolerancing to an engineering drawing to fit two or more parts.	Spring 2022	Quiz			

	Fully understand GD&T symbols and application to parts and assemblies.					
	6. Develop a complete drawing portfolio for use on a job interview. Portfolio contents to include drawing assignments from current and previous engineering drawing courses.	Spring 2023	Portfolio			

Course	Course SLO's	To be Assessed in: Semester	Assessment Method(s)	Team to Review Assessment Results	Resources Needed to Conduct Assessment	Individual Responsible for Assessment Report
ET 160	1. Develop graphic communication skills using digital media.	Fall 2018	Portfolio	Program SLO's coordinator	None	Instructor of record for that semester
	2. Edit and enhance digital media.	Spring 2019	Portfolio			
	3. Create and edit various two and three dimensional digital models.	Fall 2020	Portfolio			
	4. Create digital presentation documents.	Spring 2021	project			
	5. Share and convert digital files.	Fall 2021	Project			

PLAN OF ACTION - PRE-VALIDATION
Six Year

DEPARTMENT: Industrial Technology PROGRAM: Engineering Technology

List below as specifically as possible the actions which the department plans to take as a result of this program review. Be sure to address any problem areas which you have discovered in your analysis of the program. Number each element of your plans separately and for each, please include a target date. Additionally, indicate by the number each institutional goal and objective which is addressed by each action plan. (See Institutional Goals and Objectives)

RECOMMENDATIONS TO IMPROVE **STUDENT LEARNING OUTCOMES** AND ACHIEVMENT	**Theme/Objective/ Strategy Number AHC from Strategic Plan**	**Resources Needed**	**Target Date**
Support extra-curricular, learn-by-doing activities such as the annual Skills USA competition, which is a national organization for students in trade, industrial, technical and health occupations education. Such activities provide hands-on CAD drafting and design experience and facilitate team work and collaboration.	Goal SLSI: To ensure continuous improvement based on student learning outcomes assessment data. Goal SLS6: Engage students: Actively involve students in meaningful and authentic educational experiences and activities inside and outside the classroom.	None	Fall 2018
Create interdisciplinary opportunities, within the college, that facilitate collaboration with other programs including architecture, welding, and machine technology. The Cal Poly annual Design Village competition is an excellent opportunity for such collaboration on design, construction, and fabrication.	Goal SLS1	None	Fall 2018
Collaborate with the library on providing up-to-date resources on engineering drafting, plane surveying, GIS, computer aided drafting (CAD), and print reading & interpretation.	Goal SLS6	Books and References	Fall 20118

RECOMMENDATIONS TO ACCOMMODATE CHANGES IN **STUDENT CHARACTERISTICS**	**Theme/Objective/ Strategy Number AHC from Strategic Plan**	**Resources Needed**	**Target Date**
Enrollment Changes Add more course sections to accommodate the different schedules of a growing student body.	Goal SLS3: Ensure students are directed: Help students clarify their aspirations, develop an educational focus they perceive as meaningful and develop a plan that moves them from enrollment to achievement of their goal.	Allocate funds to pay for instructor salaries.	Fall 2019
Demographic Changes Continue outreach efforts to educate students of all ethnic groups about careers in engineering technology, and the higher-than-average earning potential for those with associate degrees. In addition, update program outreach literature/material.	Goal SLS3	Augment print Budget.	Fall 2018

RECOMMENDATIONS TO IMPROVE THE **EDUCATIONAL ENVIRONMENT**	**Theme/Objective/ Strategy Number AHC from Strategic Plan**	**Resources Needed**	**Target Date**
Curricular Changes			
Develop a two-year recommended sequence of courses for completion of ET degree/certificate programs.	Goal SLS3	Stipend	Fall 2018
Ensure CORs are updated to align with the two-year plan of degree/certification completion.	Goal SLS3	Stipend	Fall 2018 Fall 2020 Fall 2022
Create a new "Auto CAD Civil 3D" course to target topics specific to civil engineering drafting technology.	Goal SLS3	Stipend	Fall 2020
Create a new "Plane Surveying" course	Goal SLS3	Stipend	Spring 2020
Create a new Geographic Information Systems (GIS) course.	Goal SLS3	Stipend	Fall 2020
Create a new Highway Plan Reading course to address the transportation component of civil engineering technology.	Goal SLS3	Stipend	Spring 2021
Create a Building Construction Materials Strength Lab.	Goal SLS3	Stipend	Spring 2021
Review and monitor student success indicators (including degree/certificate achievement and revise or develop new curricula as needed.	Goal SLS3	Stipend	Fall 2018 Fall 2020 Fall 2022
Co-Curricular Changes			
N/A			
Neighboring College and University Plans			
Work closely with college/ high school counselors on providing students with specific advice regarding transfer, articulation, and engineering technology education and careers.	Goal SLS3	N/A	Fall 2018
Collaborate with Articulation Officer to look for articulation opportunities with other universities offering engineering programs including civil, mechanical, and manufacturing.		N/A	
Collaborate with the transfer center and Institutional Effectiveness on collecting data regarding student transfers to university engineering programs. Data to include acceptances by which university and in what program.		N/A	
Related Community Plans			
Expand the advisory committee to include professionals from civil engineering, industrial engineering, manufacturing, mechanical engineering, and drafting technology. In addition, include committee members with connection to area high schools including instructors.	Goal E1: Community Integration: Partner with workforce and industry to expand pursuit of community partnerships and search out opportunities to tell our story to advance the mission of the college.	N/A	Fall 2018
Partner with employers and the Career/Job Placement Center to develop internship/mentorship opportunities to facilitate interaction between students and professional engineers.	Goal E1: Community Integration:	N/A	Fall 2018
Provide externship and professional development opportunities i.e., conferences, workshops, seminars, in areas such as teacher training, computer aided drafting, land surveying technology, and building information modeling (BIM).	Goal E1	Stipend for externships, professional development funding.	Fall 2018

RECOMMENDATIONS THAT REQUIRE ADDITIONAL RESOURCES	Theme/Objective/ Strategy Number AHC from Strategic Plan	Resources Needed	Target Date
Facilities			
Explore the availability of the second CAD lab O112 as a space to offer additional ET courses.	Goal IR3 To enhance and maintain currency in technology usage/application in support of students and faculty, staff efficiency and operational effectiveness.	N/A	Fall 2019
Equipment			
Purchase (4) "Total Stations" for surveying, general construction layout, construction stake-out, mapping, utility mapping, GIS applications, and environmental studies. Consider "Topcon ES 52 2 Second Reflectorless Total Station 1012174-01" See: https://www.idlandsurvey.com/topcon-es-52-2-second-reflectorless-total-station-1012174-01.html	Goal IR3:To enhance and maintain currency in technology usage/application in support of students and faculty, staff efficiency and operational effectiveness.	$13,200 (Total)	Fall 2018
Purchase (4) Leica GST40 Wooden Tripods. See https://www.idlandsurvey.com/leica-gst40-wooden-tripod.html	Goal IR3	$1,320 (Total)	Fall 2018
Add 4 portable 3D printers to support outreach and marketing. Portable 3D printers such as the XYZprinting da Vinci Jr. 1.0 3D Printer are effective.	Goal IR3	$2,000 (Total)	Fall 2019
Replace existing 32 CAD stations to insure hardware compatibility with the latest software.	Goal IR3	$45,200 (Total)	Fall 2019
Replace existing 30 laptops to insure hardware compatibility with the latest software.	Goal IR3	$30,000	Fall 2021
Staffing			
Hire adjunct instructors with knowledge and experience in plane surveying, civil engineering, structural engineering, CAD drafting, highway plan reading, and GIS.	Goal IR 1: To recruit and retain quality employees.	Allocate funds to pay for instructor salaries.	Fall 2018

EXHIBITS

STUDENT DATA SUMMARY

Data analysis is a critical component of program review. The three categories below should be used as guidelines in developing a summary of the student data.

State at least three positive factors about the discipline/program identified by students. Include the number (or percentage) of students responding and any implications for planning.

1. Thirty-nine students responded to the survey conducted in October of 2017. 82% of those surveyed were highly satisfied with the quality of instruction within the program. An additional 18% of respondents were satisfied with the quality of instruction within the program.
2. 79% of those surveyed were highly satisfied and 18% were somewhat satisfied with the clarity of course goals and learning objectives.
3. 72% of those surveyed were highly satisfied and 21% somewhat satisfied with the way the program meets educational goals.

State at least three negative factors about the discipline/program identified by students. Include the number (or percentage) of students responding and any implications for planning.

1. 32% of students were neutral in their response to question 14, course assistance through tutorial services (e.g. through the Tutorial Center, Math Lab, Writing Center), indicating the need to work with the tutorial center in providing assistance.
2. While 42% were highly satisfied with the availability of appropriate resources in the libraries (question 15), 29% of those surveyed were somewhat satisfied, and 25% were neutral. As a result, there is a need to work with the library on providing appropriate resources.
3. 49% of students were highly satisfied with the availability of courses offered in the Engineering Technology program (question 8) while 40% were somewhat satisfied. 9% of those surveyed were eight dissatisfied or highly dissatisfied. There is a need to explore more fully, analyze, and schedule the addition of ET course sections to effectively respond to students' course-taking patterns and preferences.

State any other information (use responsive numbers) that you obtained from student data (e.g. focus groups, questionnaires, or SGIDs) that may be of special interest to the self-study team. What planning implications will result from this information?

34% of those surveyed are full time students, 29% are taking 5-5.8 units, and 26% are taking less than five units. Overall, 66% of students are enrolled part-time. In response to their final academic goals, 28% of those surveyed indicated that they plan to earn a Bachelors degree while 23% plan to earn an AA/AS degree. In addition, 21% are planning to earn a certificate.

31% cited several reasons for taking this and other courses in Engineering Technology program. Reasons included working towards a promotion at work, learning a new trade, changing careers, and a general interest in CAD drafting. 23% of those surveyed indicated that enrollment in engineering technology courses was recommended by a counselor. 82% of those surveyed strongly agree with recommending others to take courses in Engineering Technology program while 82% strongly agree that they would take additional courses in engineering technology.

Recommendations based on survey results:

1. Work with the tutorial center on providing assistance.
2. Collaborate with the library on providing appropriate resources.
3. Coordinate courses offered in the Engineering Technology program and courses offered in other departments that may be required for the student's major.
4. Provide professional development opportunities for instructors in the use of the college's Canvas course management system.
5. Work with counselors on providing students with information about higher education and career opportunities in engineering technology and engineering.
6. Explore the addition of ET course sections during the day to accommodate more students.

Program Review - ET

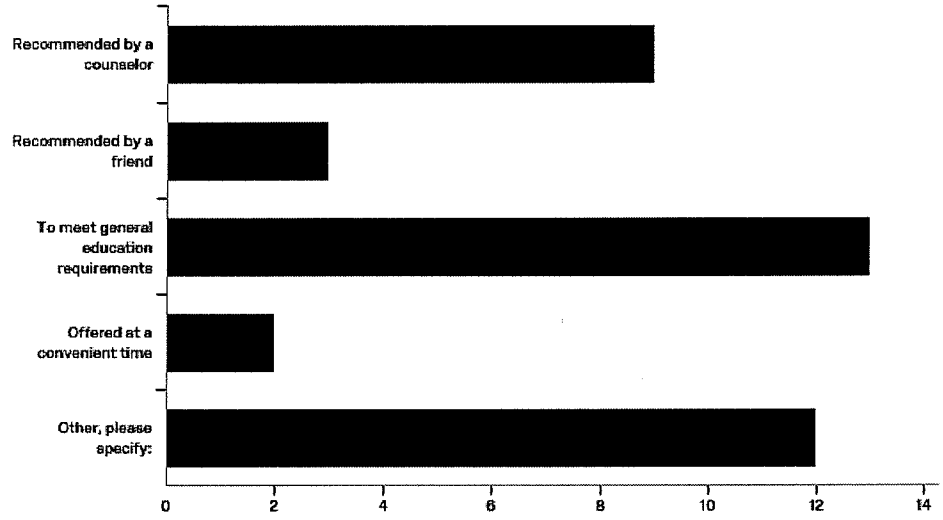
November 7th 2017, 3:50 pm MST

Part I. Please indicate how satisfied you are, in general, with the following aspects of the Engineering Technology program

#	Question	Highly satisfied		Somewhat satisfied		Neither satisfied nor dissatisfied		Somewhat dissatisfied		Highly dissatisfied		Total
1	Quality of instruction within the program	82%	32	18%	7	0%	0	0%	0	0%	0	39
2	The way textbooks and other materials used in courses within the program help me learn	47%	14	33%	10	17%	5	3%	1	0%	0	30
3	Advice about the program from counselors	55%	16	28%	8	14%	4	0%	0	3%	1	29
4	The way this program meets your educational goals	72%	28	21%	8	5%	2	3%	1	0%	0	39
5	Contribution towards your intellectual growth	66%	25	32%	12	3%	1	0%	0	0%	0	38
6	Clarity of course goals and learning objectives	79%	31	18%	7	3%	1	0%	0	0%	0	39
7	Feedback and assessment of progress towards learning objectives	69%	27	26%	10	5%	2	0%	0	0%	0	39
8	The availability of courses offered in the Engineering Technology program	49%	17	40%	14	3%	1	6%	2	3%	1	35
9	The content of courses offered in the Engineering Technology program	69%	25	28%	10	3%	1	0%	0	0%	0	36

10	The coordination of courses offered in the Engineering Technology program and courses offered in other departments that may be required for your major	50%	16	41%	13	6%	2	3%	1	0%	0	32
11	The physical facilities and space (e.g., classrooms, labs)	67%	26	28%	11	3%	1	3%	1	0%	0	39
12	Instructional equipment (e.g., computers, lab equipment)	64%	25	31%	12	3%	1	0%	0	3%	1	39
13	Presentation of classes via the college's Canvas course management system	46%	11	29%	7	21%	5	4%	1	0%	0	24
14	Course assistance through tutorial services (e.g through the Tutorial Center, Math Lab, Writing Center)	36%	8	27%	6	32%	7	5%	1	0%	0	22
15	Availability of appropriate resources in the libraries	42%	10	25%	6	29%	7	4%	1	0%	0	24

Which of the following best describes your reason for taking this and other courses in Engineering Technology program?

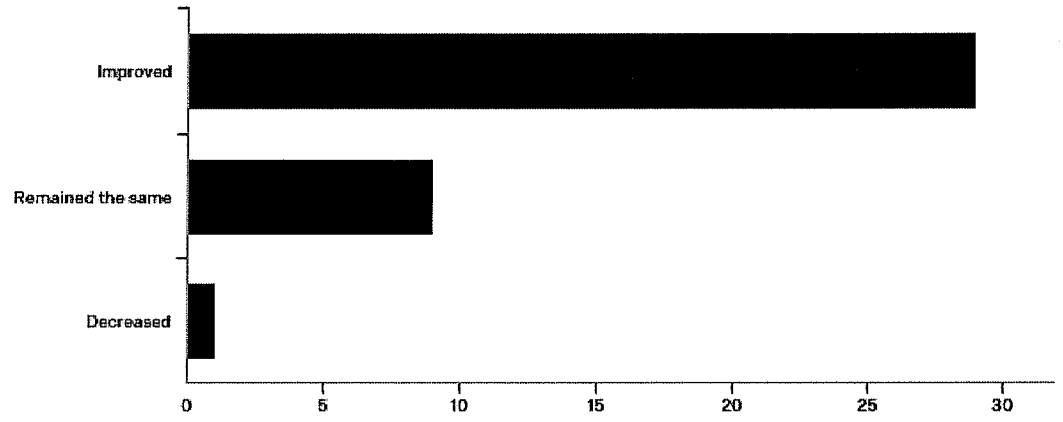


#	Answer	%	Count
1	Recommended by a counselor	23%	9
2	Recommended by a friend	8%	3
3	To meet general education requirements	33%	13
4	Offered at a convenient time	5%	2
5	Other, please specify:	31%	12
	Total	100%	39

Other, please specify:

towards my degree goals
I managed to convince the dean of student services to unlock it to me so that I can become CAD certificate by when I graduate HS
To get a certificate in drafting.
Promotion at work.
Learning a new skill/trade
Wanted to learn AutoCAD and have learned much more!
Achieve a new career skill
To peruse a welding certification
general interest
certificate for employment enhancement
For my major

Compared to the beginning of the semester, your attitude about Engineering Technology program has

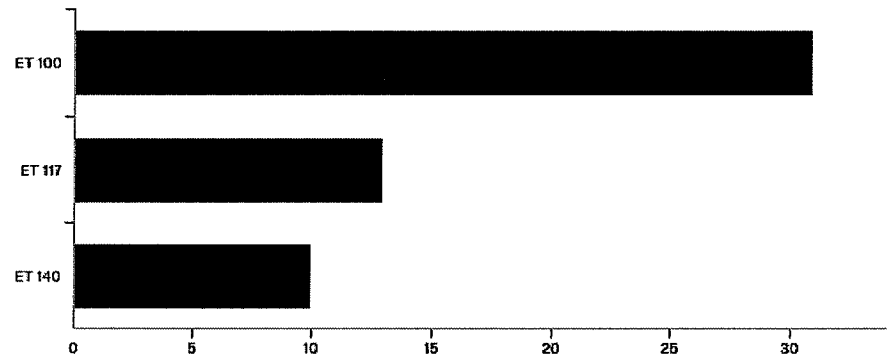


#	Answer	%	Count
1	Improved	74%	29
2	Remained the same	23%	9
3	Decreased	3%	1
	Total	100%	39

Please answer the following questions.

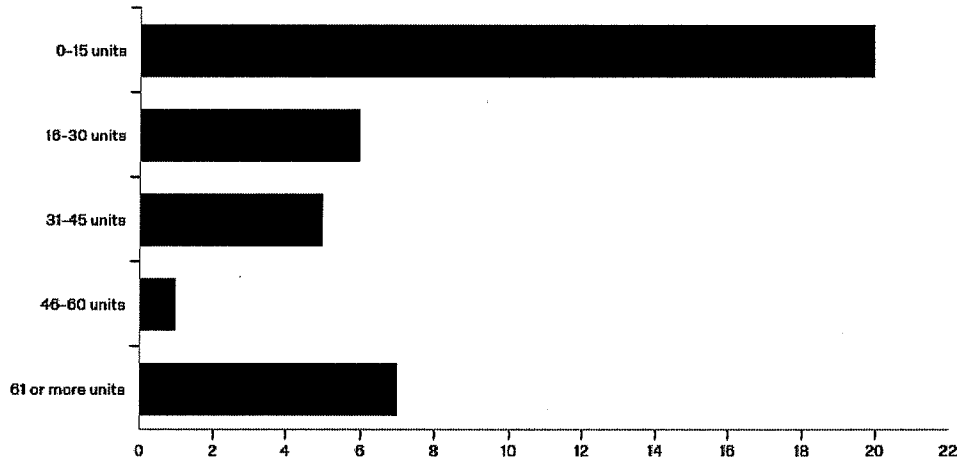
#	Question	Strongly agree		Somewhat agree		Neither agree nor disagree		Somewhat disagree		Strongly disagree		Total
1	I would recommend taking courses in Engineering Technology program	82%	32	13%	5	5%	2	0%	0	0%	0	39
2	I plan on taking additional courses in Engineering Technology program	82%	31	11%	4	8%	3	0%	0	0%	0	38

Which of the following courses have you taken in Engineering Technology program?



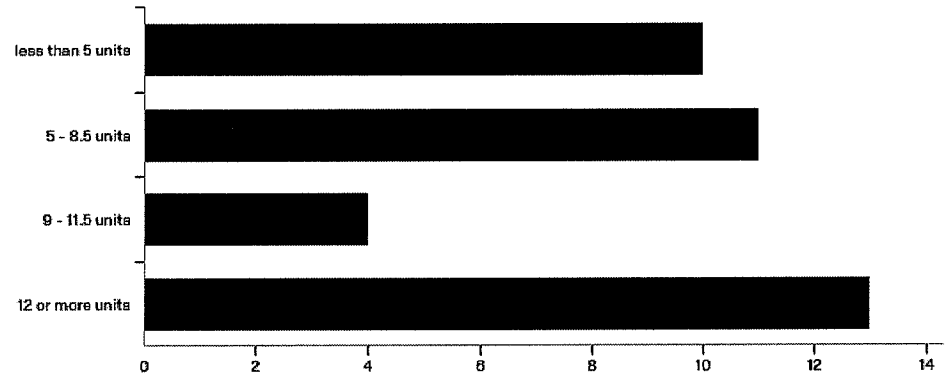
#	Answer	%	Count
1	ET 100	57%	31
2	ET 117	24%	13
3	ET 140	19%	10
	Total	100%	54

How many units have you completed prior to this semester?



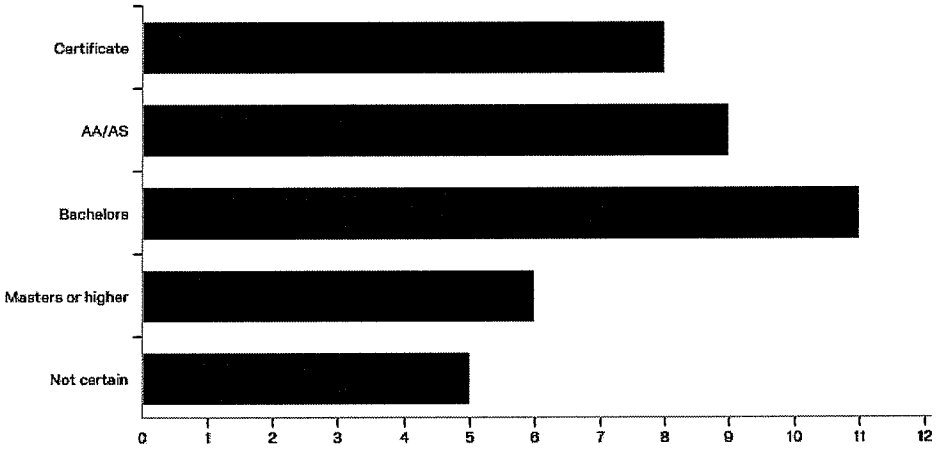
#	Answer	%	Count
1	0-15 units	51%	20
2	16-30 units	15%	6
3	31-45 units	13%	5
4	46-60 units	3%	1
5	61 or more units	18%	7
	Total	100%	39

In how many units are you currently enrolled?



#	Answer	%	Count
1	less than 5 units	26%	10
2	5 - 8.5 units	29%	11
3	9 - 11.5 units	11%	4
4	12 or more units	34%	13
	Total	100%	38

What is your final academic goal?



#	Answer	%	Count
1	Certificate	21%	8
2	AA/AS	23%	9
3	Bachelors	28%	11
4	Masters or higher	15%	6
5	Not certain	13%	5
	Total	100%	39

2017-2018 Program Review Data

Engineering Technology

If you need to explore you data further please access the publically available Tableau Reports at http://www.hancockcollege.edu/institutional_effectiveness/data.php .

For any further questions, you can contact Armando Cortez at Armando.Cortez@hancockcollege.edu .

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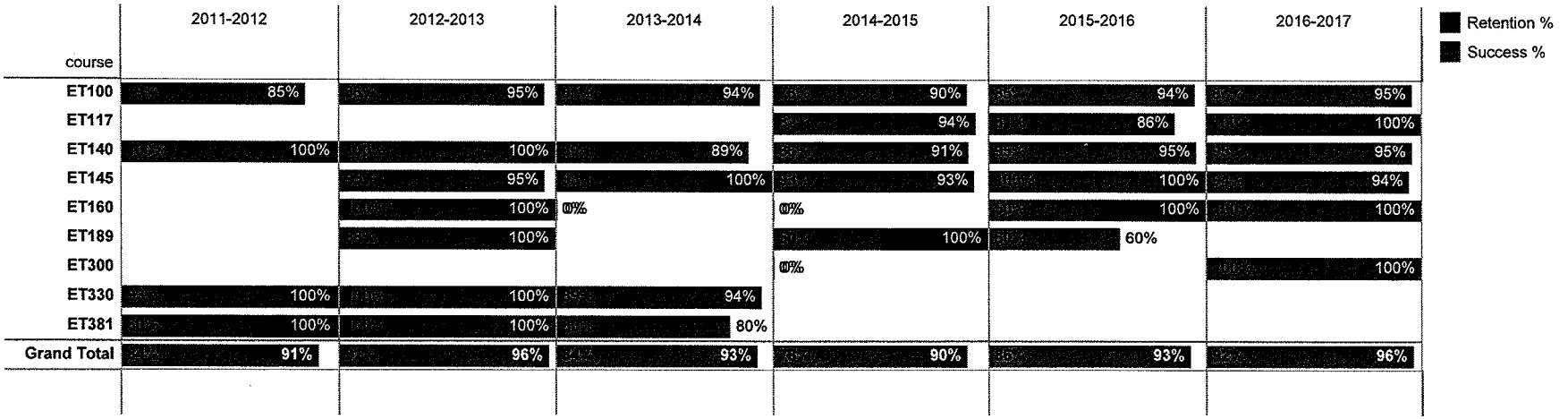
ET: OUTCOMES

subject_code
ET

	Summer 2011	Fall 2011	Spring 2012	Summer 2012	Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014	Summer 2014	Fall 2014	Spring 2015	Summer 2015	Fall 2015	Spring 2016	Summer 2016	Fall 2016	Spring 2017
Sections	1	3	3	1	5	4	1	5	4	1	6	4	1	5	4	1	5	3
Headcount	15	52	39	17	41	46	17	51	43	25	57	48	26	56	45	19	49	43
Enrollment	15	52	39	17	41	55	17	57	47	25	65	52	26	66	46	23	50	46
retained	14	47	35	16	39	54	16	53	43	25	55	48	25	59	44	23	48	43
Retention %	93.3%	90.4%	89.7%	94.1%	95.1%	98.2%	94.1%	93.0%	91.5%	100.0%	84.6%	92.3%	96.2%	89.4%	95.7%	100.0%	96.0%	93.5%
success	14	44	31	16	35	52	15	50	37	25	45	41	24	54	41	23	46	40
Success %	93.3%	84.6%	79.5%	94.1%	85.4%	94.5%	88.2%	87.7%	78.7%	100.0%	69.2%	78.8%	92.3%	81.8%	89.1%	100.0%	92.0%	87.0%
FTES	2.5	9.6	5.7	3.0	7.5	8.8	2.8	10.5	8.1	4.3	11.0	8.9	4.5	10.8	8.1	3.8	9.1	7.8



ALL AHC: OUTCOMES

	Summer 2011	Fall 2011	Spring 2012	Summer 2012	Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014	Summer 2014	Fall 2014	Spring 2015	Summer 2015	Fall 2015	Spring 2016	Summer 2016	Fall 2016	Spring 2017
Sections	314	1,023	1,146	293	1,004	1,087	285	1,069	1,141	306	1,141	1,209	355	1,177	1,220	357	1,184	1,214
Headcount	5,798	10,957	11,736	5,551	10,883	11,361	5,421	10,922	11,293	5,185	11,084	11,249	5,593	10,982	11,341	4,354	12,111	11,636
Enrollment	9,242	29,219	30,988	8,784	28,559	29,609	8,455	28,612	29,369	8,168	29,153	28,984	8,789	28,471	28,153	8,305	29,268	28,161
Retention %	85.5%	86.7%	84.6%	89.8%	86.6%	86.2%	89.1%	87.0%	85.2%	89.4%	86.8%	85.4%	89.6%	86.4%	89.4%	90.4%	88.0%	88.1%
Success %	74.3%	68.6%	69.1%	77.3%	69.6%	70.4%	77.5%	70.6%	70.2%	77.7%	69.8%	71.4%	77.4%	70.2%	73.2%	79.6%	71.5%	74.0%
FTES	1,072	3,905	3,879	1,001	3,775	3,813	978	3,852	3,868	944	3,900	4,048	1,009	3,807	3,715	967	4,197	4,020

ET: Retention & Success

course	Summer 2011	Summer 2012	Summer 2013	Summer 2014	Summer 2015	Summer 2016
ET100	93%	94%	94%	100%	96%	100%
Grand Total	93%	94%	94%	100%	96%	100%

course	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016
ET100	83%	91%	100%	79%	89%	95%
ET117				100%	92%	100%
ET140	100%	100%	89%	91%	95%	95%
ET160		100%	0%	0%	100%	100%
ET189		100%		100%	60%	
ET300				0%		100%
ET330			88%			
ET381	100%	100%	100%			
Grand Total	90%	95%	93%	85%	89%	96%

course	Spring 2012	Spring 2013	Spring 2014	Spring 2015	Spring 2016	Spring 2017
ET100	82%	100%	86%	92%	100%	87%
ET117				90%	78%	100%
ET145		95%	100%	93%	100%	94%
ET160					100%	
ET189		100%		100%		
ET330	100%	100%	100%			
ET381	100%		0%			
Grand Total	90%	98%	91%	92%	96%	93%

Retention % Success %

ET: DEMOGRAPHICS

subject_code
ET

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
age_category	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
Under 19	23	5	23	6	17	4	30	7	19	4	20	4
20-24	31	6	29	7	36	8	31	8	40	10	33	9
25-29	12	3	7	3	15	4	20	5	17	5	9	3
30-34	4	1	8	2	10	2	8	2	5	2	4	1
35-39	5	1	4	1	2	1	6	2	7	1	5	1
40-49	6	1	4	1	7	2	5	0	5	1	6	1
50+	5	1	5	1	5	1	5	1	1	0	5	1

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
ETHNICITY	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
Asian	2	0	1	0	4	1	3	1	3	1	1	0
Black	1	0					1	0	1	0	1	0
Filipono	3	1	6	2	2	0	4	1	3	1	2	0
Hispanic	42	8	45	11	45	11	60	14	44	11	37	9
Native Am	1	0	1	0	1	0	1	0	2	1	2	0
Pac Isl	1	0									1	0
Unknown											1	0
White	35	8	26	6	38	9	35	8	37	10	34	9

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
Gender	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
Female	12	2	8	1	12	3	11	3	12	3	12	2
Male	73	16	71	18	78	18	92	21	78	21	67	17
Unknown							1	0				

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
Enrollment Status	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
First Time Student	10	2	12	2	11	2	19	4	9	2	6	1
First Time Transfer	3	1	6	1	6	1	2	0	6	2	6	1
Continuing	61	12	52	14	59	15	71	17	74	19	62	16
Returning	12	2	11	2	15	3	11	2	8	1	7	1
NA	3	1	3	1	3	1	5	1			2	0
Grand Total	85	18	79	19	90	21	104	24	90	23	79	19

ALL AHC CREDIT: DEMOGRAPHICS

subject_code
All

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
age_category	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
Under 19	4,349	2,778	4,318	2,784	4,221	2,720	4,268	2,742	4,527	2,758	5,797	3,013
20-24	6,375	3,402	6,362	3,337	6,302	3,417	6,121	3,441	6,054	3,341	5,695	3,354
25-29	2,631	1,117	2,564	1,029	2,497	1,100	2,584	1,182	2,555	1,118	2,433	1,242
30-34	1,597	541	1,585	514	1,520	508	1,542	563	1,533	528	1,377	570
35-39	1,021	334	950	291	978	317	944	320	969	292	919	353
40-49	1,416	422	1,324	382	1,253	378	1,212	400	1,261	356	1,037	372
50+	993	257	919	250	878	259	891	244	966	248	786	223

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
ETHNICITY	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
Asian	593	302	638	282	627	297	585	277	582	275	512	264
Black	658	339	625	342	634	327	617	340	673	359	583	326
Filipono	490	294	447	261	450	271	477	320	473	292	483	309
Hispanic	7,495	4,232	7,604	4,253	7,654	4,475	7,959	4,698	8,196	4,670	8,206	4,873
Native Am	286	142	290	142	261	136	270	144	263	133	307	144
Other	6	1	2	0	1	0	5	1	2	0	4	1
Pac Isl	93	60	103	59	105	50	122	59	97	50	119	62
Unknown	35	4	5	0	2	0	7	1	3	0	6	2
White	7,844	3,477	7,503	3,248	7,033	3,143	6,671	3,050	6,728	2,862	7,016	3,146

	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
Gender	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
Female	8,738	4,804	8,529	4,526	8,474	4,635	8,255	4,714	8,361	4,479	8,771	4,922
Male	8,753	4,039	8,674	4,058	8,283	4,061	8,450	4,174	8,645	4,159	8,343	4,182
Unknown	13	7	5	3	4	2	3	2	3	2	109	23

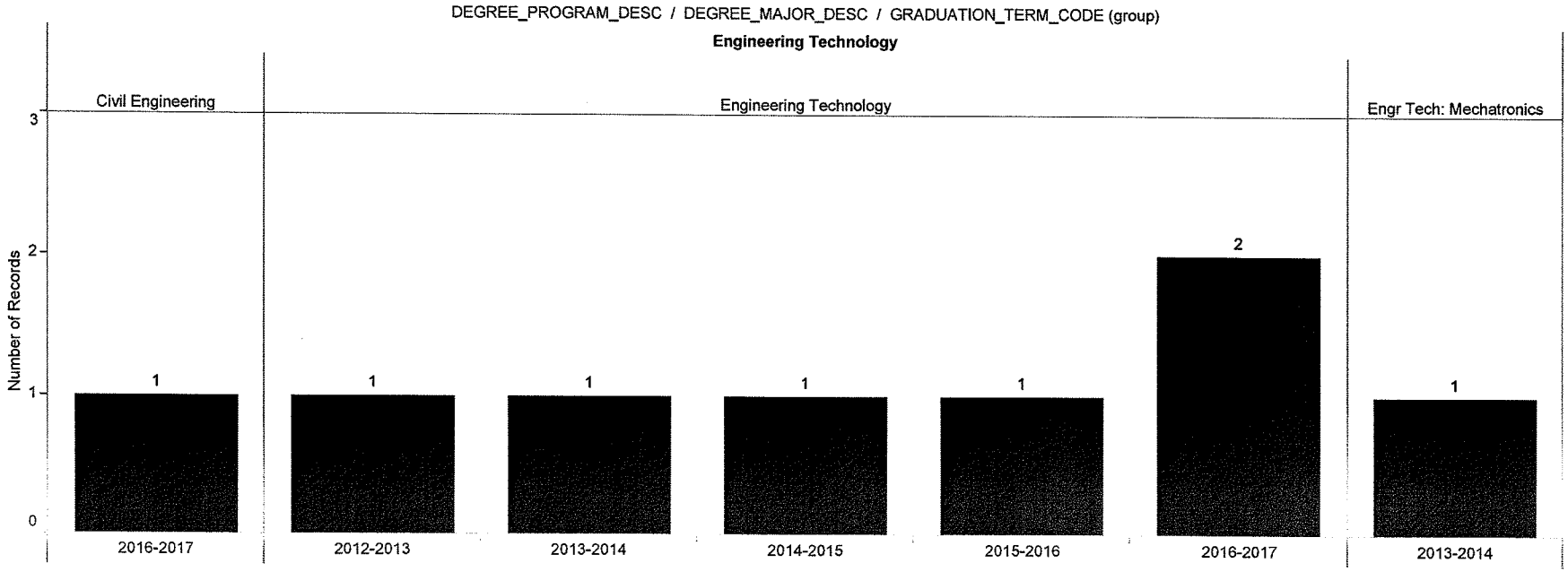
	2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
Enrollment Status	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES	Headcount	FTES
First Time Student	2,804	972	2,455	801	2,859	1,169	2,904	1,176	2,920	1,185	2,778	1,194
First Time Transfer	2,538	546	3,096	695	2,871	681	2,408	598	2,634	616	2,111	541
Continuing	10,766	6,193	9,894	5,704	9,365	5,831	10,408	6,335	10,181	5,991	10,505	6,487
Returning	3,839	1,034	4,709	1,286	4,211	919	3,041	672	3,196	675	2,281	552
NA	474	90	475	94	505	96	560	107	935	173	2,260	353
Unknown	25	14	14	7	6	3	13	3	6	2	4	0
Grand Total	17,500	8,850	17,208	8,587	16,760	8,699	16,707	8,891	17,007	8,641	17,223	9,127

Engineering Technology: Degrees & Certificates

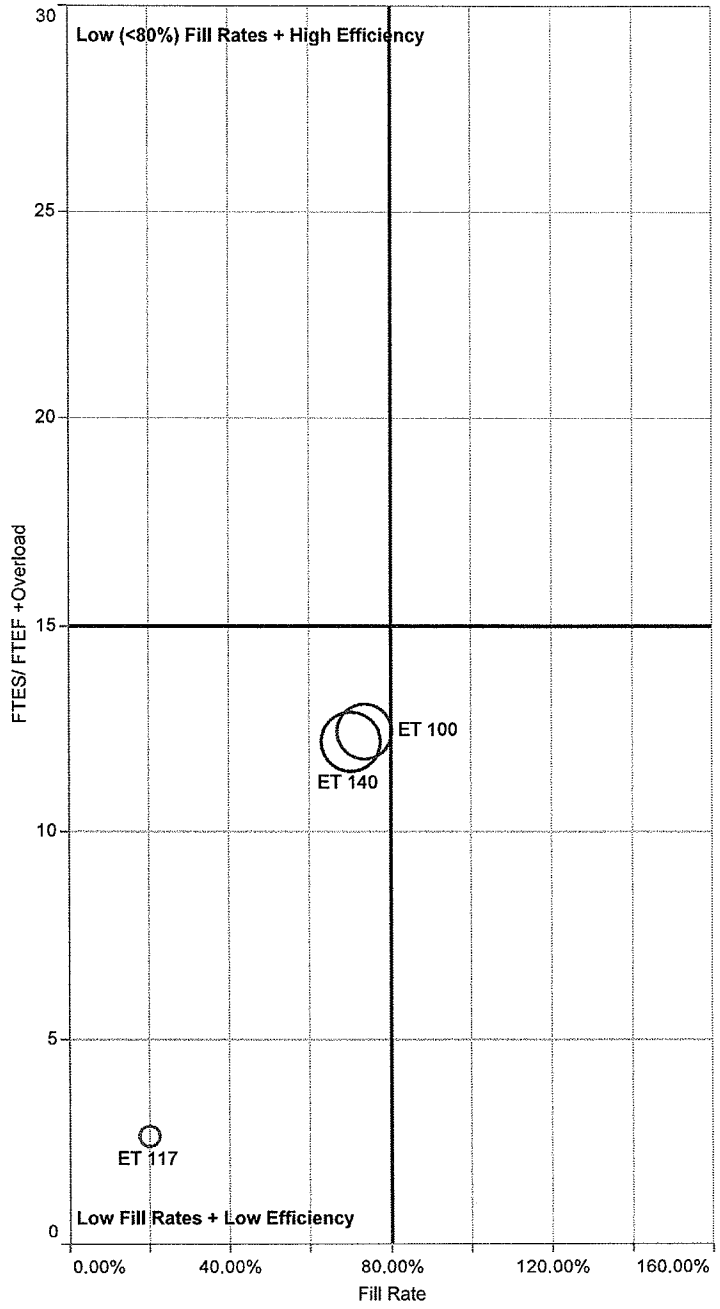
DEGREE_PROGRAM_DESC
Engineering Technology

			GRADUATION_TERM_CODE (group)					
DEGREE_PRO..	DEGREE_MAJOR_DESC	DEGREE_CODE	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	Grand Total
Engineering Technology	Civil Engineering	AS					1	1
	Engineering Technology	AS	1	1	1	1	2	6
	Engr Tech: Mechatronics	AS		1				1
	Total		1	2	1	1	3	8
Grand Total			1	2	1	1	3	8

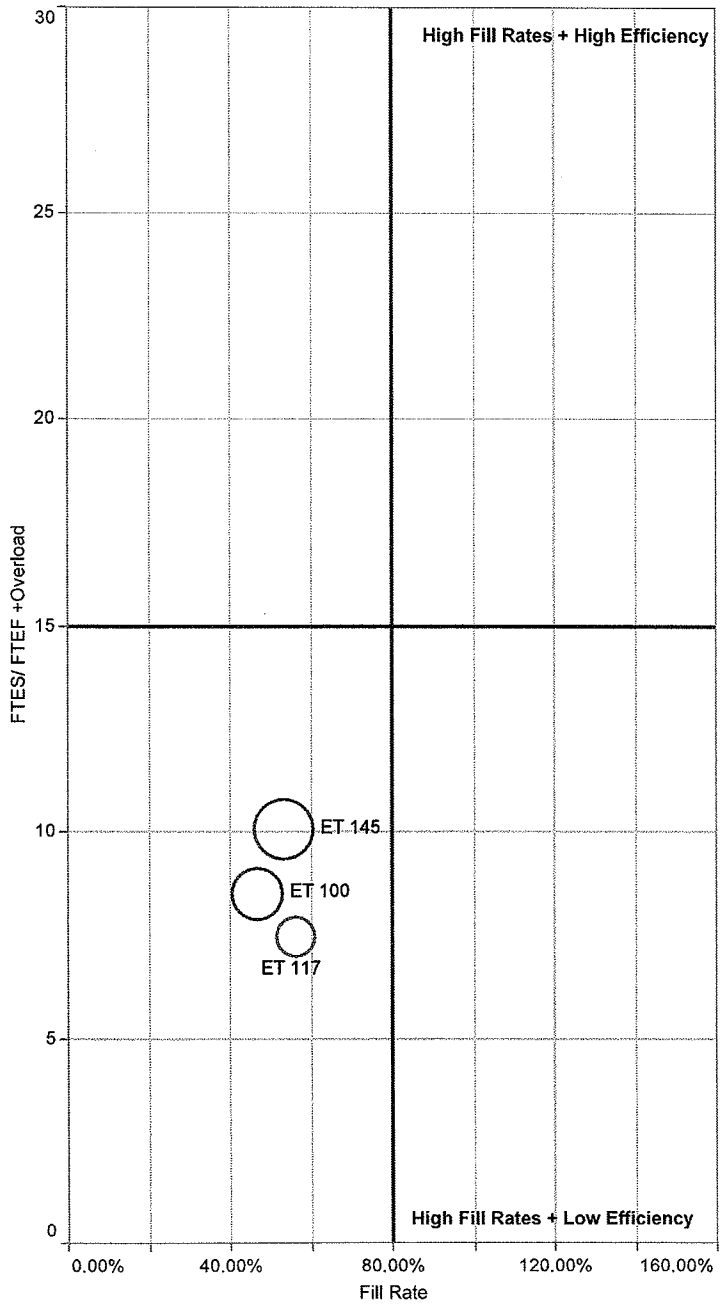
Degrees & Certificates



ET: Course Efficiency - Fall 2016



ET: Course Efficiency - Spring 2017



Subject Code
ET

Totals Fall 2016

FTES/FTEF	10.43
FTES	9.14
FTEF	0.88
Fill Rate	33%
Sections	5
Avg Class Size	10
Day 1 Waitlist	0

Totals Spring 2017

FTES/FTEF	8.91
FTES	7.75
FTEF	0.87
Fill Rate	52%
Sections	3
Avg Class Size	15
Day 1 Waitlist	0

Efficiency is the ratio of FTES to FTEF or 'how many FTES are generated per FTEF'.

The threshold for efficiency is 15 and the threshold for fill rate is 80%

If courses have similar data the circles will overlap

ET: Course Efficiency

AcademicYear	Term Code - Desc	Division Desc	Subject Code	course	Max. Lab Sessions_	FTES/FTEF	FTES	FTEF	Enrollment	Max Enrollment	Fill Rate	Day 1 Waitlist	Demand Ratio	
2016-2017	Summer 2016	Industrial Technology	ET	ET 100	1.0	12.39	3.83	0.31	23.0	32.0	72%	0.0	72%	
				Total	1.0	12.39	3.83	0.31	23.0	32.0	72%	0.0	72%	
	Fall 2016	Industrial Technology	ET	ET 100	1.0	12.45	3.85	0.31	22.0	30.0	73%	0.0	73%	
				ET 117	0.0	2.67	0.53	0.20	5.0	25.0	20%	0.0	20%	
				ET 140	1.0	12.20	4.49	0.37	21.0	30.0	70%	0.0	70%	
				ET 160	1.0		0.17	0.00	1.0	32.0	3%	0.0	3%	— cross listed
				ET 300	0.0		0.11	0.00	1.0	35.0	3%	0.0	3%	— cross listed
				Total	1.0	10.43	9.14	0.88	50.0	152.0	33%	0.0	33%	
	Spring 2017	Industrial Technology	ET	ET 100	1.0	8.49	2.62	0.31	15.0	32.0	47%	0.0	47%	
				ET 117	0.0	7.48	1.50	0.20	14.0	25.0	56%	0.0	56%	
				ET 145	1.0	10.06	3.63	0.36	17.0	32.0	53%	0.0	53%	
				Total	1.0	8.91	7.75	0.87	46.0	89.0	52%	0.0	52%	
Grand Total					1.0	10.08	20.73	2.06	119.0	273.0	44%	0.0	44%	

ET: FTEF, FTES, Efficiency

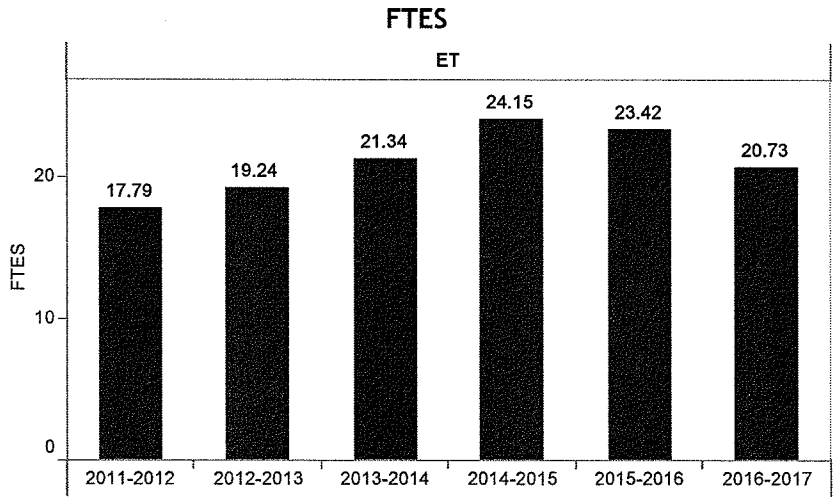
Subject
ET

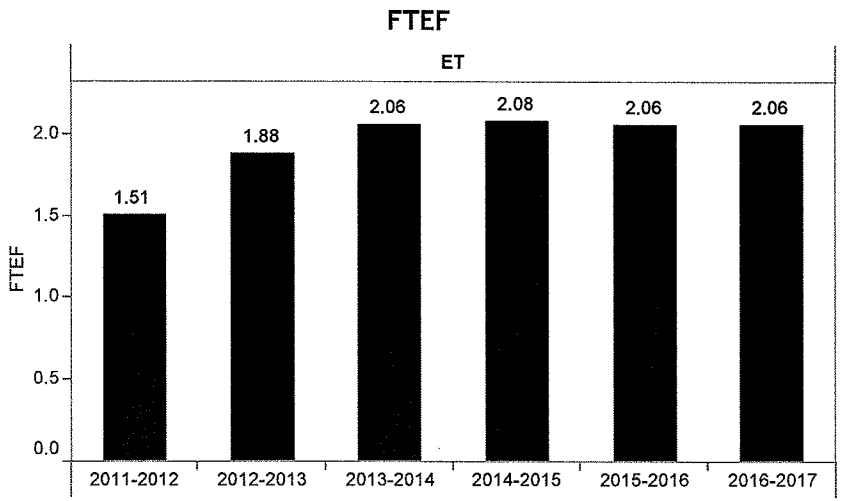
Subject__
ET

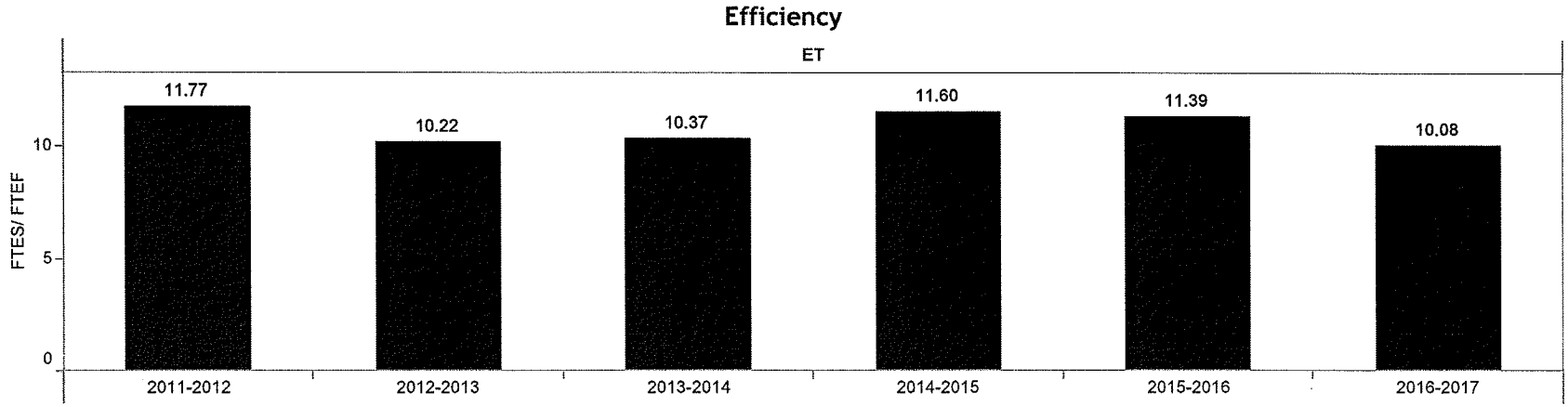
Academic Year
Multiple values

Academic Year

Subject__	2011-2012			2012-2013			2013-2014			2014-2015			2015-2016			2016-2017		
	FTEF	FTES	FTES/ FTEF	FTEF	FTES	FTES/ FTEF	FTEF	FTES	FTES/ FTEF	FTEF	FTES	FTES/ FTEF	FTEF	FTES	FTES/ FTEF	FTEF	FTES	FTES/ FTEF
ET	1.511	17.79	11.77	1.883	19.24	10.22	2.058	21.34	10.37	2.082	24.15	11.60	2.056	23.42	11.39	2.056	20.73	10.08
Grand Total	1.511	17.79	11.77	1.883	19.24	10.22	2.058	21.34	10.37	2.082	24.15	11.60	2.056	23.42	11.39	2.056	20.73	10.08







ET: FTEF by Faculty Type

If multiple faculty teach the same course the TOTAL section count may not equal the SUM of sections shown

Subject_ All

Academic Year Multiple values

Academic Year

Subject_	Faculty Type	2011-2012 FTEF	2011-2012 Overload	2011-2012 Faculty	2011-2012 Sections	2012-2013 FTEF	2012-2013 Overload	2012-2013 Faculty	2012-2013 Sections	2013-2014 FTEF	2013-2014 Overload	2013-2014 Faculty	2013-2014 Sections
ET	Instructional - FT									0.000	0.000	2.00	2.00
	Instructional - PT	1.511	0.000	4.00	8.00	1.883	0.000	6.00	11.00	2.058	0.000	4.00	8.00
	Total	1.511	0.000	4.00	8.00	1.883	0.000	6.00	11.00	2.058	0.000	6.00	10.00
Grand Total		1.511	0.000	4.00	8.00	1.883	0.000	6.00	11.00	2.058	0.000	6.00	10.00

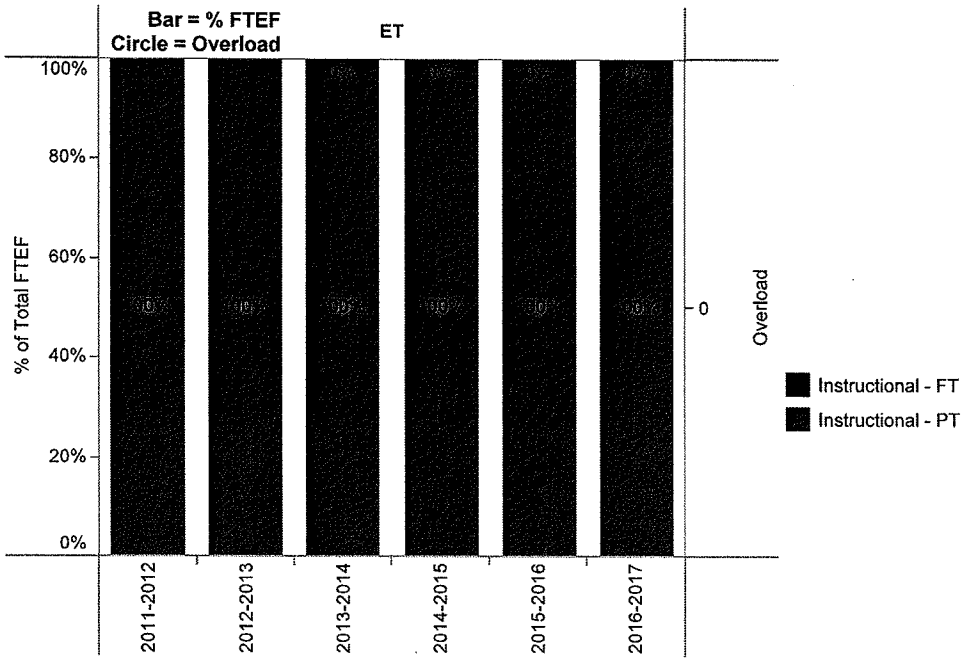
EL?

Academic Year

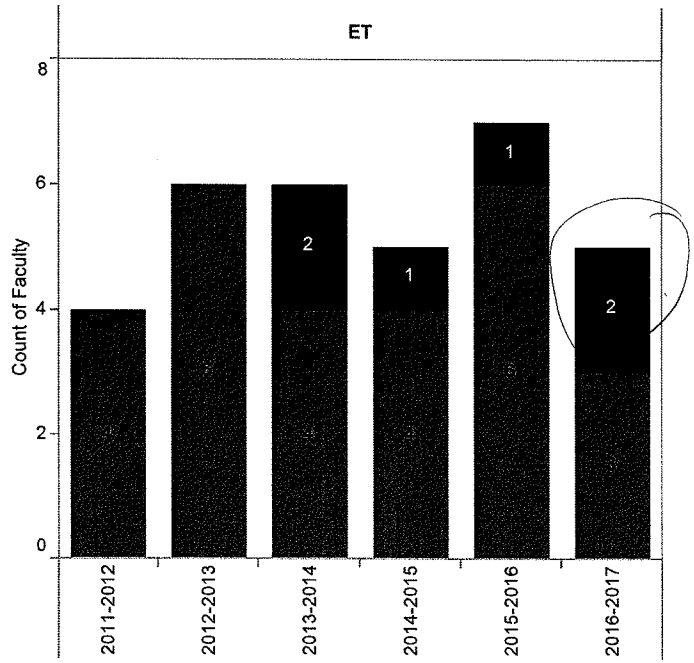
Subject_	Faculty Type	2014-2015 FTEF	2014-2015 Overload	2014-2015 Faculty	2014-2015 Sections	2015-2016 FTEF	2015-2016 Overload	2015-2016 Faculty	2015-2016 Sections	2016-2017 FTEF	2016-2017 Overload	2016-2017 Faculty	2016-2017 Sections
ET	Instructional - FT	0.000	0.000	1.00	2.00	0.000	0.000	1.00	1.00	0.000	0.000	2.00	3.00
	Instructional - PT	2.082	0.000	4.00	11.00	2.056	0.000	6.00	11.00	2.056	0.000	3.00	8.00
	Total	2.082	0.000	5.00	13.00	2.056	0.000	7.00	12.00	2.056	0.000	5.00	11.00
Grand Total		2.082	0.000	5.00	13.00	2.056	0.000	7.00	12.00	2.056	0.000	5.00	11.00

R Mabry? – SkillsUSA?

ET: % of Total FTEF, Overload



ET: Count of Faculty Type



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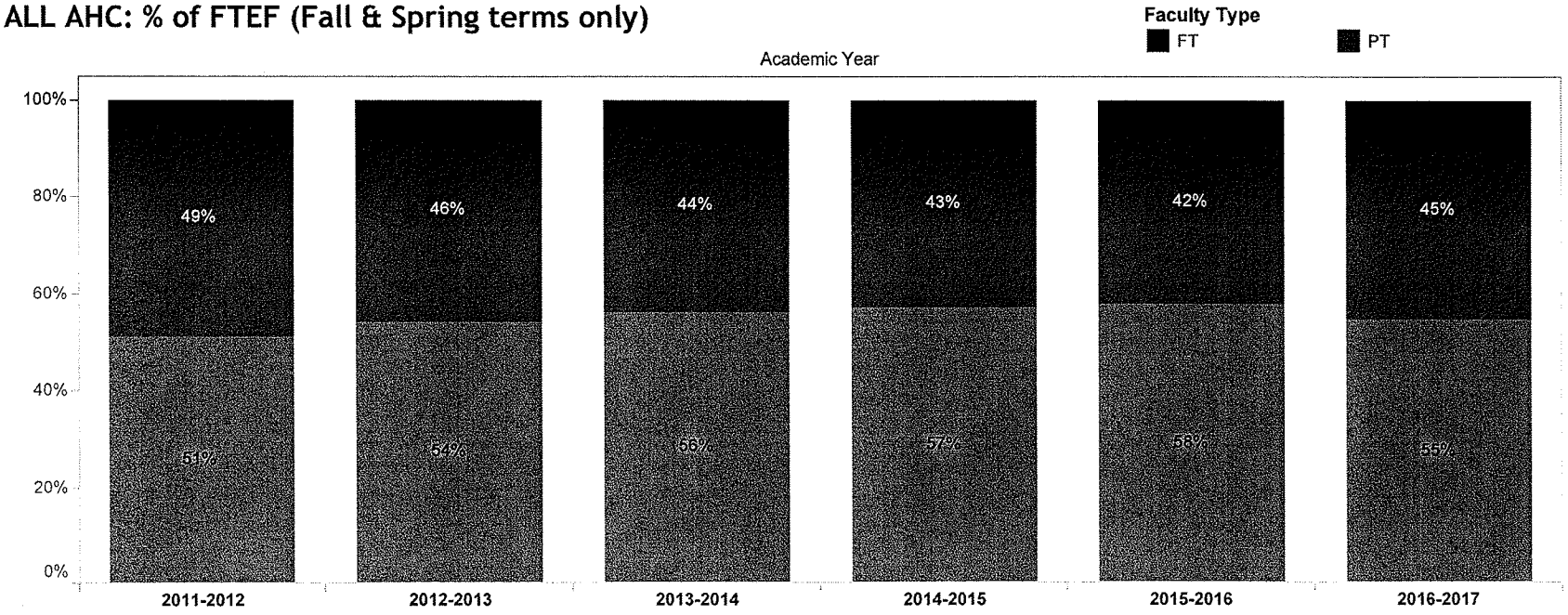
ALL AHC: FTEF by Faculty Type

		Academic Year						
Instruction Type	**Faculty Type_**	**2010-2011**	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**	**2016-2017**
Instructional	FT	233.5	226.1	222.3	221.5	211.1	219.2	235.5
	PT	325.5	282.5	308.9	334.9	358.5	379.7	356.5
	Total	558.9	508.6	531.2	556.4	569.6	598.9	592.0
NonInstructional	FT	47.8	45.5	51.5	55.4	68.3	70.9	74.1
	PT	24.3	25.6	30.8	30.4	35.5	37.4	36.3
	Total	72.1	71.0	82.3	85.8	103.8	108.3	110.4
Grand Total		631.1	579.6	613.4	642.2	673.4	707.2	702.4

ALL AHC: % of FTEF (Fall & Spring terms only)



Allan Hancock College

ILO/PSLO Summary Map by Course/Context

Map Origin: Courses for Engineering Technology
Map Target: PSLOs for Engineering Technology

	Engineering Tech: Civil Engineering Program Outcomes AS				
PSLOs / Course	ET CIVIL PSLO - Develop familiarity with the components, materials, types, and methods of building construction; terminology as applied to codes, foundations, concrete, light frame wood, heavy timber, soils, and the structural elements.	ET CIVIL PSLO - Become familiar with the origin, nature and application of the fundamental concepts and principles of physics and its application to the field of civil engineering technology.	ET CIVIL PSLO - Become familiar with the principles of physical geology including the identification of rocks and minerals.	ET CIVIL PSLO - Be able to interpret topographical and geological maps.	ET CIVIL PSLO - Become familiar with land forms and structures.
AB330					
AT330					
ET100					
ET117					
ET140					
ET145					
ET160					
ET300					
ET330					
MT330					

Course \ PSLOs	Engineering Tech: Civil Engineering Program Outcomes AS	Engineering Tech: Emphasis in Mechatronics Program Outcomes AS & Cert			
	ET CIVIL PSLO - Become familiar with force systems and equilibrium condition and develop the ability to use these principles to solve engineering problems.	ET MECHATRONICS PSLO - Demonstrate a fundamental mastery of knowledge and the use of electronic equipment in electrical, digital and analog circuits.	ET MECHATRONICS PSLO - Use computer simulation and design software to conduct, analyze and interpret electrical, digital and analog circuits.	ET MECHATRONICS PSLO - Make calculations involving various electrical laws, formulas, and principles for predicting circuit parameters using algebra and trigonometry required for electronics.	ET MECHATRONICS PSLO - Use research strategies to acquire information pertinent to the solution of electronic circuits and systems.
AB330					
AT330					
ET100					
ET117					
ET140					
ET145					
ET160					
ET300					
ET330					
MT330					

Course \ PSLOs	Engineering Tech: Emphasis in Mechatronics Program Outcomes AS & Cert			Engineering Tech: Engineering Drafting Program Outcomes Cert	
	ET MECHATRONICS PSLO - Write technical laboratory reports with conclusions.	ET MECHATRONICS PSLO - Demonstrate learned skills with a capstone project requiring you to design, build and evaluate a piece of electronic equipment.	ET MECHATRONICS PSLO - Apply current knowledge and adapt to emerging applications of automation and control.	ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions.	ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications.
AB330				2	2
AT330				2	2
ET100				1	1
ET117				1	2
ET140			1	1	
ET145				1	
ET160					
ET300					
ET330				2	2
MT330				2	2
			1	12	11

Course \ PSLOs	Engineering Tech: Engineering Drafting Program Outcomes Cert	Engineering Tech: Program Outcomes AS			
	ET DRAFTING PSLO - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.	ET GENERAL PSLO - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development.	ET GENERAL PSLO - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings.	ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners.	ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies.
AB330				1	2
AT330				1	2
ET100	1	1	1	1	1
ET117	1			1	
ET140				3	2
ET145			2	3	
ET160					
ET300					
ET330				1	2
MT330				1	2
	2	**1**	**3**	**12**	**11**

Allan Hancock College

SLO Performance Report

by SLO

Department: Engineering Technology

Courses: All Courses

Terms: Spring 2017, Fall 2016, Spring 2016, Fall 2015, Spring 2015, Fall 2014, Spring 2014, Fall 2013, Spring 2013, Fall 2012, Spring 2012, Fall 2011

SLOs: PSLOs for Engineering Technology

Date: 09/01/2017

PSLO: ET CIVIL PSLO - Develop familiarity with the components, materials, types, and methods of building construction; terminology as applied to codes, foundations, concrete, light frame wood, heavy timber, soils, and the structural elements.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET CIVIL PSLO - Become familiar with the origin, nature and application of the fundamental concepts and principles of physics and its application to the field of civil engineering technology.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET CIVIL PSLO - Become familiar with the principles of physical geology including the identification of rocks and minerals.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET CIVIL PSLO - Be able to interpret topographical and geological maps.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET CIVIL PSLO - Become familiar with land forms and structures.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET CIVIL PSLO - Become familiar with force systems and equilibrium condition and develop the ability to use these principles to solve engineering problems.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET MECHATRONICS PSLO - Demonstrate a fundamental mastery of knowledge and the use of electronic equipment in electrical, digital and analog circuits.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET MECHATRONICS PSLO - Use computer simulation and design software to conduct, analyze and interpret electrical, digital and analog circuits.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET MECHATRONICS PSLO - Make calculations involving various electrical laws, formulas, and principles for predicting circuit parameters using algebra and trigonometry required for electronics.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET MECHATRONICS PSLO - Use research strategies to acquire information pertinent to the solution of electronic circuits and systems.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET MECHATRONICS PSLO - Write technical laboratory reports with conclusions.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET MECHATRONICS PSLO - Demonstrate learned skills with a capstone project requiring you to design, build and evaluate a piece of electronic equipment.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	0	0.00%	0	0.00%	0	0.00%

PSLO: ET MECHATRONICS PSLO - Apply current knowledge and adapt to emerging applications of automation and control.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	6	37.50%	10	62.50%	0	0.00%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	6	37.50%	10	62.50%	0	0.00%

PSLO: ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	88	43.56%	102	50.50%	12	5.94%
Spring 2014	8	57.14%	6	42.86%	0	0.00%
Fall 2014	15	78.95%	4	21.05%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	111	47.23%	112	47.66%	12	5.11%

PSLO: ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	40	43.01%	41	44.09%	12	12.90%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	40	43.01%	41	44.09%	12	12.90%

PSLO: ET DRAFTING PSLO - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	37	78.72%	7	14.89%	3	6.38%
Spring 2014	9	60.00%	6	40.00%	0	0.00%
Fall 2014	15	78.95%	4	21.05%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	61	75.31%	17	20.99%	3	3.70%

PSLO: ET GENERAL PSLO - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	0	0.00%	0	0.00%	0	0.00%
Spring 2014	20	68.97%	9	31.03%	0	0.00%
Fall 2014	31	79.49%	8	20.51%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	51	75.00%	17	25.00%	0	0.00%

PSLO: ET GENERAL PSLO - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	0	0.00%	0	0.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	17	70.83%	4	16.67%	3	12.50%
Spring 2014	10	71.43%	4	28.57%	0	0.00%
Fall 2014	16	84.21%	3	15.79%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	43	75.44%	11	19.30%	3	5.26%

PSLO: ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	5	50.00%	2	20.00%	3	30.00%
Spring 2012	10	38.46%	16	61.54%	0	0.00%
Fall 2012	8	53.33%	6	40.00%	1	6.67%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	94	39.50%	140	58.82%	4	1.68%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	117	40.48%	164	56.75%	8	2.77%

PSLO: ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards	
Fall 2011	0	0.00%	0	0.00%	0	0.00%
Spring 2012	0	0.00%	0	0.00%	0	0.00%
Fall 2012	21	70.00%	9	30.00%	0	0.00%
Spring 2013	0	0.00%	0	0.00%	0	0.00%
Fall 2013	105	42.00%	136	54.40%	9	3.60%
Spring 2014	0	0.00%	0	0.00%	0	0.00%
Fall 2014	0	0.00%	0	0.00%	0	0.00%
Spring 2015	0	0.00%	0	0.00%	0	0.00%
Fall 2015	0	0.00%	0	0.00%	0	0.00%
Spring 2016	0	0.00%	0	0.00%	0	0.00%
Fall 2016	0	0.00%	0	0.00%	0	0.00%
Spring 2017	0	0.00%	0	0.00%	0	0.00%
Overall	126	45.00%	145	51.79%	9	3.21%

Allan Hancock College

SLO Performance - By Department, Context, CSLO

Program: Engineering Technology Date: 09/28/2017

Terms Spring 2017, Fall 2016, Spring 2016, Fall 2015, Spring 2015, Fall 2014, Spring 2014, Fall 2013, Spring 2013, Fall 2012, Spring 2012, Fall 2011

AB330: Print Reading & Interpretation

AB330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	2	40.00%	2	40.00%	1	20.00%	0	0.00%	5	100.00%
Spring 2012	0	0.00%	3	100.00%	0	0.00%	0	0.00%	3	100.00%
Fall 2011	5	50.00%	2	20.00%	3	30.00%	0	0.00%	10	100.00%
Totals	7	38.89%	7	38.89%	4	22.22%	0	0.00%	18	100.00%

AB330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	2	20.00%	5	50.00%	3	30.00%	0	0.00%	10	100.00%
Totals	2	20.00%	5	50.00%	3	30.00%	0	0.00%	10	100.00%

AB330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	8	40.00%	10	50.00%	2	10.00%	0	0.00%	20	100.00%
Totals	8	40.00%	10	50.00%	2	10.00%	0	0.00%	20	100.00%

AB330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	4	40.00%	6	60.00%	0	0.00%	0	0.00%	10	100.00%
Totals	4	40.00%	6	60.00%	0	0.00%	0	0.00%	10	100.00%

AB330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	11	55.00%	9	45.00%	0	0.00%	0	0.00%	20	100.00%
Totals	11	55.00%	9	45.00%	0	0.00%	0	0.00%	20	100.00%

AB330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	0	0.00%	4	80.00%	1	20.00%	0	0.00%	5	100.00%
Totals	0	0.00%	4	80.00%	1	20.00%	0	0.00%	5	100.00%

AB330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	3	30.00%	6	60.00%	1	10.00%	0	0.00%	10	100.00%
Totals	3	30.00%	6	60.00%	1	10.00%	0	0.00%	10	100.00%

Totals for CSLOs

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	30	37.50%	42	52.50%	8	10.00%	0	0.00%	80	100.00%

Spring 2012	0	0.00%	3	100.00%	0	0.00%	0	0.00%	3	100.00%
Fall 2011	5	50.00%	2	20.00%	3	30.00%	0	0.00%	10	100.00%
Totals	35	37.63%	47	50.54%	11	11.83%	0	0.00%	93	100.00%

AT330: Print Reading & Interpretation

AT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	0	0.00%	1	100.00%	0	0.00%	0	0.00%	1	100.00%
Totals	0	0.00%	1	100.00%	0	0.00%	0	0.00%	1	100.00%

AT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	0	0.00%	2	100.00%	0	0.00%	0	0.00%	2	100.00%
Totals	0	0.00%	2	100.00%	0	0.00%	0	0.00%	2	100.00%

AT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	1	25.00%	2	50.00%	1	25.00%	0	0.00%	4	100.00%
Totals	1	25.00%	2	50.00%	1	25.00%	0	0.00%	4	100.00%

AT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	0	0.00%	1	50.00%	1	50.00%	0	0.00%	2	100.00%
Totals	0	0.00%	1	50.00%	1	50.00%	0	0.00%	2	100.00%

AT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	2	50.00%	2	50.00%	0	0.00%	0	0.00%	4	100.00%
Totals	2	50.00%	2	50.00%	0	0.00%	0	0.00%	4	100.00%

AT330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	0	0.00%	0	0.00%	1	100.00%	0	0.00%	1	100.00%
Totals	0	0.00%	0	0.00%	1	100.00%	0	0.00%	1	100.00%

AT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	0	0.00%	2	100.00%	0	0.00%	0	0.00%	2	100.00%
Totals	0	0.00%	2	100.00%	0	0.00%	0	0.00%	2	100.00%

Totals for CSLOs

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	3	18.75%	10	62.50%	3	18.75%	0	0.00%	16	100.00%
Totals	3	18.75%	10	62.50%	3	18.75%	0	0.00%	16	100.00%

ET100: Computer-Aided Drafting

ET100 SLO1 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Explain and understand the basic components of a CADD system (Hard Drive, Monitor, Keyboard and USB ports.)

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2014	16	69.57%	3	13.04%	0	0.00%	4	17.39%	23	100.00%
Spring 2014	10	55.56%	4	22.22%	0	0.00%	4	22.22%	18	100.00%
Fall 2013	17	65.38%	4	15.38%	3	11.54%	2	7.69%	26	100.00%
Totals	43	64.18%	11	16.42%	3	4.48%	10	14.93%	67	100.00%

ET100 SLO2 - Perform commands on a CADD system to create engineering drawings. Commands such as construction lines, arcs, circles, arrays, layers, multiline text, properties, etc.

Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A	Total

ET100 SLO3 - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, engineering lettering, dimensioning, sections, surface finish, standard tolerancing, threads, and fasteners. Ability to incorporate the above into an engineering drawing using input commands.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	20	76.92%	3	11.54%	0	0.00%	3	11.54%	26	100.00%
Totals	20	76.92%	3	11.54%	0	0.00%	3	11.54%	26	100.00%

ET100 SLO4 - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development. This to include Performing various manipulation commands on a CADD system.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2014	31	67.39%	8	17.39%	0	0.00%	7	15.22%	46	100.00%
Spring 2014	20	55.56%	9	25.00%	0	0.00%	7	19.44%	36	100.00%
Totals	51	62.20%	17	20.73%	0	0.00%	14	17.07%	82	100.00%

ET100 SLO5 - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. Perform commands so as to secure hardcopies from a printing devise of such drawings and specifications.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2014	15	65.22%	4	17.39%	0	0.00%	4	17.39%	23	100.00%
Spring 2014	8	44.44%	6	33.33%	0	0.00%	4	22.22%	18	100.00%
Totals	23	56.10%	10	24.39%	0	0.00%	8	19.51%	41	100.00%

ET100 SLO6 - Develop the ability to read engineering drawings and specifications. Perform commands so as to secure hard copies from a printing devise of such drawings and specifications.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	17	65.38%	4	15.38%	3	11.54%	2	7.69%	26	100.00%
Totals	17	65.38%	4	15.38%	3	11.54%	2	7.69%	26	100.00%

ET100 SLO7 - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2014	15	65.22%	4	17.39%	0	0.00%	4	17.39%	23	100.00%
Spring 2014	9	50.00%	6	33.33%	0	0.00%	3	16.67%	18	100.00%
Fall 2013	37	71.15%	7	13.46%	3	5.77%	5	9.62%	52	100.00%
Totals	61	65.59%	17	18.28%	3	3.23%	12	12.90%	93	100.00%

Totals for CSLOs

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2014	77	66.96%	19	16.52%	0	0.00%	19	16.52%	115	100.00%
Spring 2014	47	52.22%	25	27.78%	0	0.00%	18	20.00%	90	100.00%
Fall 2013	91	70.00%	18	13.85%	9	6.92%	12	9.23%	130	100.00%
Totals	215	64.18%	62	18.51%	9	2.69%	49	14.63%	335	100.00%

ET117: Print Reading & Interpretation

ET117 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

CSLO not included in any Assessment Rubric

ET117 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

CSLO not included in any Assessment Rubric

ET117 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

CSLO not included in any Assessment Rubric

ET117 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

CSLO not included in any Assessment Rubric

ET117 SLO5 - Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views.

CSLO not included in any Assessment Rubric

ET117 SLO6 - Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

CSLO not included in any Assessment Rubric

ET117 SLO7 - Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

CSLO not included in any Assessment Rubric

Totals for CSLOs

Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A	Total

ET140: Engineering Drawing

ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	17	26.56%	46	71.88%	1	1.56%	0	0.00%	64	100.00%
Totals	17	26.56%	46	71.88%	1	1.56%	0	0.00%	64	100.00%

ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	29	36.25%	48	60.00%	3	3.75%	0	0.00%	80	100.00%
Fall 2012	21	70.00%	9	30.00%	0	0.00%	0	0.00%	30	100.00%
Totals	50	45.45%	57	51.82%	3	2.73%	0	0.00%	110	100.00%

ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	32	33.33%	64	66.67%	0	0.00%	0	0.00%	96	100.00%
Fall 2012	8	53.33%	6	40.00%	1	6.67%	0	0.00%	15	100.00%
Totals	40	36.04%	70	63.06%	1	0.90%	0	0.00%	111	100.00%

ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	26	32.50%	53	66.25%	1	1.25%	0	0.00%	80	100.00%
Totals	26	32.50%	53	66.25%	1	1.25%	0	0.00%	80	100.00%

ET140 SLO5 - Develop the understanding of geometric dimensioning and tolerancing. Understand symbols and application.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	8	50.00%	7	43.75%	1	6.25%	0	0.00%	16	100.00%
Totals	8	50.00%	7	43.75%	1	6.25%	0	0.00%	16	100.00%

ET140 SLO6 - Be able to create an assembly drawing project to completion. To include creation of

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	6	37.50%	10	62.50%	0	0.00%	0	0.00%	16	100.00%
Totals	6	37.50%	10	62.50%	0	0.00%	0	0.00%	16	100.00%

ET140 SLO7 - Be able to use a 3D CADD program to create simple 3D models.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	0	0.00%	32	100.00%	0	0.00%	0	0.00%	32	100.00%
Totals	0	0.00%	32	100.00%	0	0.00%	0	0.00%	32	100.00%

Totals for CSLOs

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	118	30.73%	260	67.71%	6	1.56%	0	0.00%	384	100.00%
Fall 2012	29	64.44%	15	33.33%	1	2.22%	0	0.00%	45	100.00%
Totals	147	34.27%	275	64.10%	7	1.63%	0	0.00%	429	100.00%

ET145: Advanced Engineering Drawing

ET145 SLO1 - Develop advanced compilation skills required to complete an engineering drawing . Compile data such as heat treatment, non- destructive testing, material specification, ect.. and incorporate into an advanced engineering drawing.

CSLO not included in any Assessment Rubric

ET145 SLO2 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete and advanced engineering drawings. CADD Software to include both 2D & 3D.

Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A	Total

ET145 SLO3 - Obtain and apply all necessary drawing planning skills so at to plan and outline the steps to complete an involved project on a CADD system. Drawing planning to include title and tolerance blocks, notations, multi view drawing set-up and complete dimensioning, both general and advanced geometric dimensioning and tolerancing.

CSLO not included in any Assessment Rubric

ET145 SLO4 - Use advanced CADD skills to produce 2D and 3D engineering drawings. 3D drawings to include use of assembly tools such as mates to construct 3D assemblies.

CSLO not included in any Assessment Rubric

ET145 SLO5 - Apply advanced general and geometric tolerancing to an engineering drawing to fit two or more parts. Fully understand GD&T symbols and application to parts and assemblies.

CSLO not included in any Assessment Rubric

ET145 SLO6 – Develop a complete drawing portfolio for use on a job interview. Portfolio contents to include drawing assignments from current and previous engineering drawing courses.

CSLO not included in any Assessment Rubric

Totals for CSLOs

Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A	Total

ET160: Digital Tools in Architecture

ET160 SLO1 - Develop graphic communication skills using digital media.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Spring 2016	0	0.00%	1	100.00%	0	0.00%	0	0.00%	1	100.00%
Fall 2015	0	0.00%	0	0.00%	1	100.00%	0	0.00%	1	100.00%
Totals	0	0.00%	1	50.00%	1	50.00%	0	0.00%	2	100.00%

ET160 SLO2 - Edit and enhance digital images.

CSLO not included in any Assessment Rubric

ET160 SLO3 - Create and edit various two and three- dimensional digital models.

CSLO not included in any Assessment Rubric

ET160 SLO4 - Create digital presentation documents.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2015	0	0.00%	0	0.00%	0	0.00%	1	100.00%	1	100.00%
Totals	0	0.00%	0	0.00%	0	0.00%	1	100.00%	1	100.00%

ET160 SLO5 - Share and convert digital files.

CSLO not included in any Assessment Rubric

Totals for CSLOs

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Spring 2016	0	0.00%	1	100.00%	0	0.00%	0	0.00%	1	100.00%
Fall 2015	0	0.00%	0	0.00%	1	50.00%	1	50.00%	2	100.00%
Totals	0	0.00%	1	33.33%	1	33.33%	1	33.33%	3	100.00%

ET300: Shop Math and Measurement

ET300 SLO1 - Solve problems dealing with fractions, percentage, ratio.

Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A	Total

ET300 SLO2 - Understand and interpret decimal numbers and fractions.

CSLO not included in any Assessment Rubric

ET300 SLO3 - Select the correct method for solving an applied problem using mathematics.

CSLO not included in any Assessment Rubric

ET300 SLO4 - Define the properties of basic geometric shapes.

CSLO not included in any Assessment Rubric

ET300 SLO5 - Identify locations using the Cartesian coordinate system.

CSLO not included in any Assessment Rubric

ET300 SLO6 - Use a variety of basic and precision measuring tools.

Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A	Total

Totals for CSLOs

Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A	Total

ET330: Print Reading & Interpretation

ET330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	4	57.14%	2	28.57%	1	14.29%	0	0.00%	7	100.00%
Spring 2012	6	40.00%	9	60.00%	0	0.00%	0	0.00%	15	100.00%
Totals	10	45.45%	11	50.00%	1	4.55%	0	0.00%	22	100.00%

ET330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	7	50.00%	6	42.86%	1	7.14%	0	0.00%	14	100.00%
Totals	7	50.00%	6	42.86%	1	7.14%	0	0.00%	14	100.00%

ET330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	16	57.14%	9	32.14%	3	10.71%	0	0.00%	28	100.00%
Totals	16	57.14%	9	32.14%	3	10.71%	0	0.00%	28	100.00%

ET330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	9	64.29%	4	28.57%	1	7.14%	0	0.00%	14	100.00%
Totals	9	64.29%	4	28.57%	1	7.14%	0	0.00%	14	100.00%

ET330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	17	60.71%	8	28.57%	3	10.71%	0	0.00%	28	100.00%
Totals	17	60.71%	8	28.57%	3	10.71%	0	0.00%	28	100.00%

ET330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	3	42.86%	4	57.14%	0	0.00%	0	0.00%	7	100.00%
Totals	3	42.86%	4	57.14%	0	0.00%	0	0.00%	7	100.00%

ET330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	10	71.43%	4	28.57%	0	0.00%	0	0.00%	14	100.00%
Totals	10	71.43%	4	28.57%	0	0.00%	0	0.00%	14	100.00%

Totals for CSLOs

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	66	58.93%	37	33.04%	9	8.04%	0	0.00%	112	100.00%
Spring 2012	6	40.00%	9	60.00%	0	0.00%	0	0.00%	15	100.00%
Totals	72	56.69%	46	36.22%	9	7.09%	0	0.00%	127	100.00%

MT330: Print Reading & Interpretation

MT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	2	20.00%	8	80.00%	0	0.00%	0	0.00%	10	100.00%
Spring 2012	4	44.44%	4	44.44%	0	0.00%	1	11.11%	9	100.00%

Totals	6	31.58%	12	63.16%	0	0.00%	1	5.26%	19	100.00%

MT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	9	45.00%	9	45.00%	2	10.00%	0	0.00%	20	100.00%
Totals	9	45.00%	9	45.00%	2	10.00%	0	0.00%	20	100.00%

MT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	25	62.50%	13	32.50%	2	5.00%	0	0.00%	40	100.00%
Totals	25	62.50%	13	32.50%	2	5.00%	0	0.00%	40	100.00%

MT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	8	40.00%	11	55.00%	1	5.00%	0	0.00%	20	100.00%
Totals	8	40.00%	11	55.00%	1	5.00%	0	0.00%	20	100.00%

MT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	24	60.00%	15	37.50%	1	2.50%	0	0.00%	40	100.00%
Totals	24	60.00%	15	37.50%	1	2.50%	0	0.00%	40	100.00%

MT330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	2	20.00%	7	70.00%	1	10.00%	0	0.00%	10	100.00%
Totals	2	20.00%	7	70.00%	1	10.00%	0	0.00%	10	100.00%

MT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	9	45.00%	10	50.00%	1	5.00%	0	0.00%	20	100.00%
Totals	9	45.00%	10	50.00%	1	5.00%	0	0.00%	20	100.00%

Totals for CSLOs

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Fall 2013	79	49.38%	73	45.63%	8	5.00%	0	0.00%	160	100.00%
Spring 2012	4	44.44%	4	44.44%	0	0.00%	1	11.11%	9	100.00%
Totals	83	49.11%	77	45.56%	8	4.73%	1	0.59%	169	100.00%

Report Totals:

	Institutional Exceeds Standards		Institutional Meets Standards		Institutional Below Standards		N/A		Total	
Spring 2016	0	0.00%	1	100.00%	0	0.00%	0	0.00%	1	100.00%
Fall 2015	0	0.00%	0	0.00%	1	50.00%	1	50.00%	2	100.00%
Fall 2014	77	66.96%	19	16.52%	0	0.00%	19	16.52%	115	100.00%
Spring 2014	47	52.22%	25	27.78%	0	0.00%	18	20.00%	90	100.00%
Fall 2013	387	43.88%	440	49.89%	43	4.88%	12	1.36%	882	100.00%

Fall 2012	29	64.44%	15	33.33%	1	2.22%	0	0.00%	45	100.00%
Spring 2012	10	37.04%	16	59.26%	0	0.00%	1	3.70%	27	100.00%
Fall 2011	5	50.00%	2	20.00%	3	30.00%	0	0.00%	10	100.00%
Totals	555	47.35%	518	44.20%	48	4.10%	51	4.35%	1172	100.00%

Allan Hancock College

Course Statistics And Evidence

Engineering Technology

Date: 09/01/2017

Terms: Spring 2017, Fall 2016, Spring 2016, Fall 2015, Spring 2015, Fall 2014, Spring 2014, Fall 2013, Spring 2013, Fall 2012, Spring 2012, Fall 2011

Summary

Statistic	Number of Courses	Courses
Courses in the Department	10	AB330, AT330, ET100, ET117, ET140, ET145, ET160, ET300, ET330, MT330
Courses with CSLOs	10	AB330, AT330, ET100, ET117, ET140, ET145, ET160, ET300, ET330, MT330
Courses without CSLOs	0	
Courses with CSLOs mapped to PSLOs	10	AB330, AT330, ET100, ET117, ET140, ET145, ET160, ET300, ET330, MT330
Courses without CSLOs mapped to PSLOs	0	
Courses with direct assessment of PSLOs	0	
Courses with CSLOs mapped to ILOs	10	AB330, AT330, ET100, ET117, ET140, ET145, ET160, ET300, ET330, MT330
Courses without CSLOs mapped to ILOs	0	
Courses with direct assessment of ILOs	0	
Courses with at least one planned Assessment	8	AB330, AT330, ET100, ET140, ET160, ET300, ET330, MT330
Courses with planned Assessments scored	6	ET140, AB330, ET330, MT330, ET100, ET160
Courses with some Assessments scored	1	AT330
Courses without any Assessment scored	1	ET300
Courses with no planned Assessments	2	ET117, ET145
Courses with at least one planned Action Plan	10	AB330, AT330, ET100, ET117, ET140, ET145, ET160, ET300, ET330, MT330
Courses with Action Plan Responses	0	
Courses with some Action Plan Responses	8	ET140, AB330, AT330, ET330, MT330, ET100, ET160, ET300
Courses without Action Plan Responses	2	ET145, ET117
Courses with no planned Action Plans	0	

AB330 - Print Reading & Interpretation

SLOs

CSLOs	» AB330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing. » AB330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes. » AB330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem. » AB330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question. » AB330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings. » AB330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details. » AB330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.
	PSLO

Mapped PSLOs	Engineering Tech: Program Outcomes AS » ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners. » ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies. Engineering Tech: Engineering Drafting Program Outcomes Cert » ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. » ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. ILO 2 - Critical Thinking & Problem Solving » ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

Assessments

Fall 2011

test

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AB330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	10 of 13	50%	20%	30%	0

Spring 2012

Homework Assignment #1

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AB330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	3 of 4	0%	100%	0%	0

Fall 2013

Test #1

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AB330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	5 of 5	40%	60%	0%	0
AB330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	5 of 5	40%	60%	0%	0
AB330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	5 of 5	40%	60%	0%	0

Problems Ch. 2

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AB330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	5 of 5	40%	40%	20%	0
AB330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	5 of 5	40%	60%	0%	0

AB330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	5 of 5	60%	40%	0%	0

Problems Ch. 3

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AB330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	5 of 5	40%	40%	20%	0
AB330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	5 of 5	40%	40%	20%	0

Mid-Term

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AB330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	5 of 5	0%	60%	40%	0
AB330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	5 of 5	0%	80%	20%	0
AB330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	5 of 5	40%	60%	0%	0
AB330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	5 of 5	40%	60%	0%	0
AB330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.	5 of 5	0%	80%	20%	0
AB330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	5 of 5	20%	60%	20%	0

Problems Ch. 4

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AB330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	5 of 5	80%	20%	0%	0
AB330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	5 of 5	80%	20%	0%	0

Action Plans

Fall 2013

Course Improvement Plan Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> AB330 - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understanding of line types on a drawing.	2014-07-14	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Need more lecture on the importance of drawing notes.	2014-07-14	

What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	More instruction on line types and drawing notation.	2014-07-14	

Spring 2012

Section Improvement Plan (SIP) Engineering Technology Spring 2012

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> AB330 >> Section A - Spring 2012					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good undestanding of introduction to print reading	2013-02-16	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	not enough detail provided on Title Blocks	2013-02-16	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Review Title block in more detail provide more industry standard title blocks	2013-02-16	

Fall 2013

Section Improvement Plan (SIP) Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> AB330 >> Section A - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understanding of line types on a drawing	2013-12-07	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Need more lecture on the importance of drawing notes	2013-12-07	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	More instruction on line types and drawing notation	2013-12-07	

AT330 - Print Reading & Interpretation

SLOs

CSLOs	» AT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing. » AT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes. » AT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem. » AT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question. » AT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings. » AT330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details. » AT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.
Mapped PSLOs	**PSLO** Engineering Tech: Program Outcomes AS » ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners. » ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies. Engineering Tech: Engineering Drafting Program Outcomes Cert » ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. » ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. ILO 2 - Critical Thinking & Problem Solving

» ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

Assessments

Fall 2013

Test #1

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	1 of 1	0%	100%	0%	0
AT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	1 of 1	0%	100%	0%	0
AT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	1 of 1	0%	100%	0%	0

Problems Ch. 2

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	1 of 1	0%	100%	0%	0
AT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	1 of 1	0%	100%	0%	0
AT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	1 of 1	100%	0%	0%	0

Problems Ch. 3

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	1 of 1	0%	100%	0%	0
AT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	1 of 1	0%	100%	0%	0

Mid-Term

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	1 of 1	0%	100%	0%	0
AT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	1 of 1	0%	0%	100%	0
AT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	1 of 1	0%	0%	100%	0

AT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	1 of 1	0%	100%	0%	0
AT330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.	1 of 1	0%	0%	100%	0
AT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	1 of 1	0%	100%	0%	0

Problems Ch. 4

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
AT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	1 of 1	100%	0%	0%	0
AT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	1 of 1	100%	0%	0%	0

Action Plans

Fall 2013

Course Improvement Plan Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> AT330 - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understanding of line types and drawing notation	2014-07-14	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Still need more instruction on drawing notation	2014-07-14	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	More detail lecture on drawing notation	2014-07-14	

Fall 2013

Section Improvement Plan (SIP) Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> AT330 >> Section A - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understandin of line types and drawing notation	2013-12-07	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Still need more instruction on drawing notation	2013-12-07	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	More detail lecture on drawing notation	2013-12-07	

ET100 - Computer-Aided Drafting

SLOs

	» ET100 SLO1 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Explain and understand the basic components of a CADD system (Hard Drive, Monitor, Keyboard and USB ports.) » ET100 SLO2 - Perform commands on a CADD system to create engineering drawings. Commands such as construction lines, arcs, circles, arrays, layers, multiline text, properties, etc. » ET100 SLO3 - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, engineering lettering, dimensioning, sections, surface finish, standard tolerancing, threads, and fasteners. Ability to incorporate the above into an engineering drawing using input commands.

CSLOs	» ET100 SLO4 - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development. This to include Performing various manipulation commands on a CADD system. » ET100 SLO5 - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. Perform commands so as to secure hardcopies from a printing devise of such drawings and specifications. » ET100 SLO6 - Develop the ability to read engineering drawings and specifications. Perform commands so as to secure hard copies from a printing devise of such drawings and specifications. » ET100 SLO7 - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.
Mapped PSLOs	**PSLO** Engineering Tech: Program Outcomes AS » ET GENERAL PSLO - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development. » ET GENERAL PSLO - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. » ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners. » ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies. Engineering Tech: Engineering Drafting Program Outcomes Cert » ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. » ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications. » ET DRAFTING PSLO - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. ILO 2 - Critical Thinking & Problem Solving » ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

Assessments

Fall 2013

Exercise 3

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET100 SLO1 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Explain and understand the basic components of a CADD system (Hard Drive, Monitor, Keyboard and USB ports.)	24 of 26	70.83%	16.67%	12.5%	2
ET100 SLO6 - Develop the ability to read engineering drawings and specifications. Perform commands so as to secure hard copies from a printing devise of such drawings and specifications.	24 of 26	70.83%	16.67%	12.5%	2
ET100 SLO7 - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.	24 of 26	70.83%	16.67%	12.5%	2

Quiz 3

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A

ET100 SLO3 - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, engineering lettering, dimensioning, sections, surface finish, standard tolerancing, threads, and fasteners. Ability to incorporate the above into an engineering drawing using input commands.	23 of 26	86.96%	13.04%	0%	3
ET100 SLO7 - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.	23 of 26	86.96%	13.04%	0%	3

Spring 2014

Quiz 2

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET100 SLO4 - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development. This to include Performing various manipulation commands on a CADD system.	15 of 18	60%	40%	0%	3
ET100 SLO7 - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.	15 of 18	60%	40%	0%	3

Midterm 2

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET100 SLO1 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Explain and understand the basic components of a CADD system (Hard Drive, Monitor, Keyboard and USB ports.)	14 of 18	71.43%	28.57%	0%	4
ET100 SLO4 - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development. This to include Performing various manipulation commands on a CADD system.	14 of 18	78.57%	21.43%	0%	4
ET100 SLO5 - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. Perform commands so as to secure hardcopies from a printing devise of such drawings and specifications.	14 of 18	57.14%	42.86%	0%	4

Fall 2014

Quiz 2

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET100 SLO4 - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development. This to include Performing various manipulation commands on a CADD system.	20 of 23	70%	30%	0%	3
ET100 SLO7 - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.	19 of 23	78.95%	21.05%	0%	4

Midterm 2

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A

ET100 SLO1 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Explain and understand the basic components of a CADD system (Hard Drive, Monitor, Keyboard and USB ports.)	19 of 23	84.21%	15.79%	0%	4
ET100 SLO4 - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development. This to include Performing various manipulation commands on a CADD system.	19 of 23	89.47%	10.53%	0%	4
ET100 SLO5 - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. Perform commands so as to secure hardcopies from a printing devise of such drawings and specifications.	19 of 23	78.95%	21.05%	0%	4

Action Plans

Fall 2014

Course Improvement Plan Engineering Technology Fall 2014

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET100 - Fall 2014					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Students that have regular attendance seem to learn the material.	2015-02-05	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	n/a	2015-02-05	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Add additional points for attendance to motivate all students to attend class.	2015-02-05	

Fall 2013

Section Improvement Plan (SIP) Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET100 >> Section A - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Students seem to grasp the concept of using a CAD program to produce two dimensional drawings.	2013-12-17	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Students need to review more information on Tolerancing and Dimensioning.	2013-12-17	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	More real life examples could be used to explain section views, and other drafting topics.	2013-12-17	

Spring 2014

Section Improvement Plan (SIP) Engineering Technology Spring 2014

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET100 >> Section A - Spring 2014					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Students understood concepts discussed in class.	2014-05-22	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Only students who lacked attendance did not exceed the standard.	2014-05-22	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Make attendance more important to the grade, to encourage students to come to class.	2014-05-22	

Fall 2014

Section Improvement Plan (SIP) Engineering Technology Fall 2014

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET100 >> Section A - Fall 2014					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Students that have regular attendance seem to learn the material.	2015-01-30	

What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	No Action Taken		
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Add additional points for attendance to motivate all students to attend class.	2015-01-30	

ET117 - Print Reading & Interpretation

SLOs

CSLOs	» ET117 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing. » ET117 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes. » ET117 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem. » ET117 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question. » ET117 SLO5 - Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings. » ET117 SLO6 - Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details. » ET117 SLO7 - Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.
Mapped PSLOs	**PSLO** Engineering Tech: Program Outcomes AS » ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners. Engineering Tech: Engineering Drafting Program Outcomes Cert » ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. » ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications. » ET DRAFTING PSLO - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. ILO 2 - Critical Thinking & Problem Solving » ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

ET140 - Engineering Drawing

SLOs

CSLOs	» ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings. » ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands. » ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations. » ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts. » ET140 SLO5 - Develop the understanding of geometric dimensioning and tolerancing. Understand symbols and application. » ET140 SLO6 - Be able to create an assembly drawing project to completion. To include creation of a bill of material. » ET140 SLO7 - Be able to use a 3D CADD program to create simple 3D models.
	PSLO Engineering Tech: Program Outcomes AS » ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners.

Mapped PSLOs	» ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies. Engineering Tech: Emphasis in Mechatronics Program Outcomes AS & Cert » ET MECHATRONICS PSLO - Apply current knowledge and adapt to emerging applications of automation and control. Engineering Tech: Engineering Drafting Program Outcomes Cert » ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. » ILO 4B - Technology Literacy: Proficiency in a technology and the ability to choose the appropriate tools. ILO 2 - Critical Thinking & Problem Solving » ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

Assessments

Fall 2012

Exam

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.	15 of 15	80%	20%	0%	0

Handel Rod Assessment

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.	15 of 15	60%	40%	0%	0
ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.	15 of 15	53.33%	40%	6.67%	0

Fall 2013

Handel Rod Drawing

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.	16 of 16	56.25%	43.75%	0%	0
ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.	16 of 16	56.25%	43.75%	0%	0
ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.	16 of 16	56.25%	43.75%	0%	0

Handel Cap Drawing

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.	16 of 16	12.5%	87.5%	0%	0

ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.	16 of 16	18.75%	81.25%	0%	0
ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.	16 of 16	12.5%	87.5%	0%	0
ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.	16 of 16	6.25%	93.75%	0%	0

Cap SW Model

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO7 - Be able to use a 3D CADD program to create simple 3D models.	16 of 16	0%	100%	0%	0

Handel Rod SW Model

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO7 - Be able to use a 3D CADD program to create simple 3D models.	16 of 16	0%	100%	0%	0

5-34 Drawing (Base Plate)

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.	16 of 16	6.25%	93.75%	0%	0
ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.	16 of 16	37.5%	62.5%	0%	0
ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.	16 of 16	43.75%	56.25%	0%	0
ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.	16 of 16	12.5%	87.5%	0%	0

Sliding Bracket Drawing (Vise Assembly)

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.	16 of 16	43.75%	43.75%	12.5%	0
ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.	16 of 16	18.75%	81.25%	0%	0
ET140 SLO6 - Be able to create an assembly drawing project to completion. To include creation of a bill of material.	16 of 16	37.5%	62.5%	0%	0

Clamping Plate Drawing (Vise Assembly)

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.	16 of 16	18.75%	75%	6.25%	0

ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.	16 of 16	25%	75%	0%	0
ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.	16 of 16	37.5%	62.5%	0%	0

6-15 Bell Housing Drawing

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.	16 of 16	31.25%	62.5%	6.25%	0
ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.	16 of 16	62.5%	37.5%	0%	0
ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.	16 of 16	43.75%	56.25%	0%	0
ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.	16 of 16	50%	43.75%	6.25%	0
ET140 SLO5 - Develop the understanding of geometric dimensioning and tolerancing. Understand symbols and application.	16 of 16	50%	43.75%	6.25%	0

Action Plans

Fall 2012

Course Improvement Plan Engineering Technology Fall 2012

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET140 - Fall 2012					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	This course focuses on the application of industry standards to an engineering drawing. In addition, the course emphasizes the clarity and accuracy of engineering graphics communication.	2012-11-16	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	More lectures are needed on the topic of drawing scale in order to give students a better understanding of the general appearance of engineering drawings	2012-11-16	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Allocate more time to the topic of drawing scale and to the accurate transfer from digital to paper media.	2012-11-16	

Fall 2012

Section Improvement Plan (SIP) Engineering Technology Fall 2012

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET140 >> Section A - Fall 2012					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understanding of AutoCad commands Good understanding of Title blocks & multi-view projection	2013-02-15	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	More instruction on dimensioning & tolerancing required	2013-02-15	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	More focus on basic dimensioning techniques	2013-02-15	

Fall 2013

Section Improvement Plan (SIP) Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET140 >> Section A - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Students understand the concept of multi-view drawing Undestand drilling and tapping Undestand Section Views	2013-12-07	

What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	More instruction on section views Need more lecture on how an assembly effects each part and drawing need more instruction on drill and tapping	2013-12-07	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Increase the use of more examples of assemblies and how they effect the drawing and dimension of components bring in actual fasteners into class for examples more instruction on section views	2013-12-07	

ET145 - Advanced Engineering Drawing

SLOs

CSLOs	» ET145 SLO1 - Develop advanced compilation skills required to complete an engineering drawing . Compile data such as heat treatment, non- destructive testing, material specification, ect.. and incorporate into an advanced engineering drawing. » ET145 SLO2 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete and advanced engineering drawings. CADD Software to include both 2D & 3D. » ET145 SLO3 - Obtain and apply all necessary drawing planning skills so at to plan and outline the steps to complete an involved project on a CADD system. Drawing planning to include title and tolerance blocks, notations, multi view drawing set-up and complete dimensioning, both general and advanced geometric dimensioning and tolerancing. » ET145 SLO4 - Use advanced CADD skills to produce 2D and 3D engineering drawings. 3D drawings to include use of assembly tools such as mates to construct 3D assemblies. » ET145 SLO5 - Apply advanced general and geometric tolerancing to an engineering drawing to fit two or more parts. Fully understand GD&T symbols and application to parts and assemblies. » ET145 SLO6 – Develop a complete drawing portfolio for use on a job interview. Portfolio contents to include drawing assignments from current and previous engineering drawing courses.
Mapped PSLOs	**PSLO** Engineering Tech: Program Outcomes AS » ET GENERAL PSLO - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. » ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners. Engineering Tech: Engineering Drafting Program Outcomes Cert » ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. ILO 2 - Critical Thinking & Problem Solving » ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

ET160 - Digital Tools in Architecture

SLOs

CSLOs	» ET160 SLO1 - Develop graphic communication skills using digital media. » ET160 SLO2 - Edit and enhance digital images. » ET160 SLO3 - Create and edit various two and three- dimensional digital models. » ET160 SLO4 - Create digital presentation documents. » ET160 SLO5 - Share and convert digital files.
Mapped PSLOs	**PSLO** Architecture Program Outcomes » ARCH PSLO - Develop manual and computer-aided graphic communication skills.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4B - Technology Literacy: Proficiency in a technology and the ability to choose the appropriate tools. ILO 1 - Communication » ILO 1 - Communication: Communicate effectively using verbal, visual and written language with clarity and purpose in workplace, community and academic contexts.

Assessments

Fall 2015

Final Portfolio

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET160 SLO1 - Develop graphic communication skills using digital media.	1 of 1	0%	0%	100%	0
ET160 SLO4 - Create digital presentation documents.	0 of 1	0%	0%	0%	1

Spring 2016

Final Portfolio

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET160 SLO1 - Develop graphic communication skills using digital media.	1 of 1	0%	100%	0%	0
ET160 SLO4 - Create digital presentation documents.	0 of 1	0%	0%	0%	0

Action Plans

Spring 2015

Section Improvement Plan

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET160 >> Section A - Spring 2015					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	This is a cross listed course, see ARCH160.	2015-12-16	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	This is a cross listed course, see ARCH160.	2015-12-16	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	This is a cross listed course, see ARCH160.	2015-12-16	

Fall 2015

Fall 2015 Section Improvement Plan

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET160 >> Section A - Fall 2015					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	This is a cross listed course, see ARCH160.	2015-12-16	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	This is a cross listed course, see ARCH160.	2015-12-16	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	This is a cross listed course, see ARCH160.	2015-12-16	

Spring 2016

Spring 2016 Section Improvement Plan (Courses)

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET160 >> Section 41250 - Spring 2016					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	The importance of submitting a portfolio, even in an incomplete form is important.	2016-05-26	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Not completing homework assignments is reducing the quality of the final portfolio.	2016-05-26	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Introduce portfolio development earlier in the course and encourage students to add assignments as they are completed.	2016-05-26	

Fall 2016

Section Improvement Plan

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET160 >> Section 20694 - Fall 2016					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	The software used in the instruction is SketchUp, which meets the needs of both architecture and engineering students. Engineering students focus on the design of machine parts and the presentation of assembly drawings. The software is also able to create standard views typically used in engineering drawings.	2017-01-30	

What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	The course is designed to meet the needs of both architecture and engineering students. As a result, a more balanced focus between the two disciplines is needed. Typically more architecture students enroll in the course Arch 160, however, there is a need to introduce more engineering problems and solutions to meet the needs of	2017-01-30	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Introduce more engineering problems and solutions to meet the needs of engineering students.	2017-01-30	

ET300 - Shop Math and Measurement

SLOs

CSLOs	» ET300 SLO1 - Solve problems dealing with fractions, percentage, ratio. » ET300 SLO2 - Understand and interpret decimal numbers and fractions. » ET300 SLO3 - Select the correct method for solving an applied problem using mathematics. » ET300 SLO4 - Define the properties of basic geometric shapes. » ET300 SLO5 - Identify locations using the Cartesian coordinate system. » ET300 SLO6 - Use a variety of basic and precision measuring tools.
Mapped PSLOs	**PSLO** Machine Technology Program Outcomes » MT PSLO3 - Possess essential academic skills in reading, writing, math, using and locating information and basic computer competency. » MT PSLO6 - Function effectively in a manufacturing environment containing a variety of production, welding, machining and metal-forming or CNC equipment. » MT PSLO7 - Possess a variety of basic and high-tech skills consistent with modern manufacturing processes.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. ILO 5 - Quantitative Literacy » ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems. ILO 2 - Critical Thinking & Problem Solving » ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

ET330 - Print Reading & Interpretation

SLOs

CSLOs	» ET330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing. » ET330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes. » ET330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem. » ET330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question. » ET330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings. » ET330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details. » ET330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.
Mapped PSLOs	**PSLO** Engineering Tech: Program Outcomes AS » ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners. » ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies. Engineering Tech: Engineering Drafting Program Outcomes Cert » ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. » ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications.

Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. ILO 2 - Critical Thinking & Problem Solving » ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

Assessments

Spring 2012

Home Work No. 1

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	15 of 15	40%	60%	0%	0

Fall 2013

Test #1

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	7 of 7	85.71%	14.29%	0%	0
ET330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	7 of 7	85.71%	14.29%	0%	0
ET330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	7 of 7	85.71%	14.29%	0%	0

Problems Ch. 2

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	7 of 7	57.14%	28.57%	14.29%	0
ET330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	7 of 7	71.43%	14.29%	14.29%	0
ET330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	7 of 7	57.14%	28.57%	14.29%	0

Problems Ch. 3

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	7 of 7	57.14%	28.57%	14.29%	0
ET330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	7 of 7	71.43%	14.29%	14.29%	0

Mid-Term

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	7 of 7	42.86%	57.14%	0%	0

ET330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	7 of 7	14.29%	85.71%	0%	0
ET330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	7 of 7	57.14%	42.86%	0%	0
ET330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	7 of 7	42.86%	57.14%	0%	0
ET330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.	7 of 7	42.86%	57.14%	0%	0
ET330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	7 of 7	57.14%	42.86%	0%	0

Problems Ch. 4

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
ET330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	7 of 7	57.14%	14.29%	28.57%	0
ET330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	7 of 7	57.14%	14.29%	28.57%	0

Action Plans

Fall 2013

Course Improvement Plan Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET330 - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understanding of line types and drawing notation	2014-07-14	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Some students did not due well ono problems I need to clarify how important attendance is for class	2014-07-14	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	More detail instruction on linetypes and drawing notes	2014-07-14	

Fall 2013

Section Improvement Plan (SIP) Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> ET330 >> Section A - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understanding of line types and drawing notation	2013-12-07	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	Some students did not due well ono problems I need to clarify how important attendance is for class	2013-12-07	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	More detail instruction on linetypes and drawing notes	2013-12-07	

MT330 - Print Reading & Interpretation

SLOs

	» MT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing. » MT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

CSLOs	» MT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem. » MT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question. » MT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings. » MT330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details. » MT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.
Mapped PSLOs	**PSLO** Engineering Tech: Program Outcomes AS » ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners. » ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies. Engineering Tech: Engineering Drafting Program Outcomes Cert » ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. » ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications.
Mapped ILOs	**ILO** ILO 4 - Information & Technology Literacy » ILO 4A - Information Literacy: Define what information is needed to solve a real-life issue and locate, access, evaluate and manage the information. ILO 2 - Critical Thinking & Problem Solving » ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion.

Assessments

Spring 2012

Home Work No. 1

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
MT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	8 of 9	50%	50%	0%	1

Fall 2013

Test #1

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
MT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	10 of 10	70%	30%	0%	0
MT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	10 of 10	70%	30%	0%	0
MT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	10 of 10	70%	30%	0%	0

Problems Ch. 2

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
MT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.	10 of 10	20%	80%	0%	0

MT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	10 of 10	50%	50%	0%	0
MT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	10 of 10	60%	40%	0%	0

Problems Ch. 3

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
MT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	10 of 10	70%	20%	10%	0
MT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	10 of 10	80%	10%	10%	0

Mid-Term

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
MT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.	10 of 10	20%	70%	10%	0
MT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	10 of 10	20%	70%	10%	0
MT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.	10 of 10	30%	60%	10%	0
MT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	10 of 10	30%	60%	10%	0
MT330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.	10 of 10	20%	70%	10%	0
MT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.	10 of 10	20%	70%	10%	0

Problems Ch. 4

SLO	Scored	Institutional Exceeds Standards	Institutional Meets Standards	Institutional Below Standards	N/A
MT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.	10 of 10	80%	20%	0%	0
MT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.	10 of 10	80%	20%	0%	0

Action Plans

Fall 2013

Course Improvement Plan Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request

Allan Hancock College >> Engineering Technology >> MT330 - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understanding of line types on a drawing and drawing notes	2014-07-14	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	None at this time	2014-07-14	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Given scores none at this time	2014-07-14	

Spring 2012

Section Improvement Plan (SIP) Engineering Technology Spring 2012

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> MT330 >> Section A - Spring 2012					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good knowledge of introduction to print reading good understanding of title blocks and tolerance blocks	2013-02-16	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	more detail and explanation required	2013-02-16	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	use of more drawing examples	2013-02-16	

Fall 2013

Section Improvement Plan (SIP) Engineering Technology Fall 2013

Expected Action	Action Type	Respondent	Action Taken	Date	Resource Request
Allan Hancock College >> Engineering Technology >> MT330 >> Section A - Fall 2013					
What did the assessment data indicate about the strengths of your course?	No action type	Anonymous	Good understanding of line types on a drawing and drawing notes	2013-12-07	
What did the assessment data indicate about the weaknesses of your course?	No action type	Anonymous	None at this time	2013-12-07	
What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?	No action type	Anonymous	Given scores none at this time	2013-12-07	

Allan Hancock College

SLO Presentation

Engineering Technology
Date: 09/01/2017

Engineering Technology

PSLO

Engineering Tech: Civil Engineering Program Outcomes AS

- ET CIVIL PSLO - Develop familiarity with the components, materials, types, and methods of building construction; terminology as applied to codes, foundations, concrete, light frame wood, heavy timber, soils, and the structural elements.
- ET CIVIL PSLO - Become familiar with the origin, nature and application of the fundamental concepts and principles of physics and its application to the field of civil engineering technology.
- ET CIVIL PSLO - Become familiar with the principles of physical geology including the identification of rocks and minerals.
- ET CIVIL PSLO - Be able to interpret topographical and geological maps.
- ET CIVIL PSLO - Become familiar with land forms and structures.
- ET CIVIL PSLO - Become familiar with force systems and equilibrium condition and develop the ability to use these principles to solve engineering problems.

Engineering Tech: Emphasis in Mechatronics Program Outcomes AS & Cert

- ET MECHATRONICS PSLO - Demonstrate a fundamental mastery of knowledge and the use of electronic equipment in electrical, digital and analog circuits.
- ET MECHATRONICS PSLO - Use computer simulation and design software to conduct, analyze and interpret electrical, digital and analog circuits.
- ET MECHATRONICS PSLO - Make calculations involving various electrical laws, formulas, and principles for predicting circuit parameters using algebra and trigonometry required for electronics.
- ET MECHATRONICS PSLO - Use research strategies to acquire information pertinent to the solution of electronic circuits and systems.
- ET MECHATRONICS PSLO - Write technical laboratory reports with conclusions.
- ET MECHATRONICS PSLO - Demonstrate learned skills with a capstone project requiring you to design, build and evaluate a piece of electronic equipment.
- ET MECHATRONICS PSLO - Apply current knowledge and adapt to emerging applications of automation and control.

Engineering Tech: Engineering Drafting Program Outcomes Cert

- ET DRAFTING PSLO - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions.
- ET DRAFTING PSLO - Develop the ability to read engineering drawings and specifications.
- ET DRAFTING PSLO - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.

Engineering Tech: Program Outcomes AS

- ET GENERAL PSLO - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development.
- ET GENERAL PSLO - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings.
- ET GENERAL PSLO - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners.
- ET GENERAL PSLO - Develop the ability to use advanced technical drawing techniques on a CAD system to solve design component problems requiring details and assemblies.

CSLO

AB330 - Print Reading & Interpretation

- AB330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.
- AB330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.
- AB330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

• AB330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

• AB330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.

• AB330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

• AB330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

AT330 - Print Reading & Interpretation

• AT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

• AT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

• AT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

• AT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

• AT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.

• AT330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

• AT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

ET100 - Computer-Aided Drafting

• ET100 SLO1 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Explain and understand the basic components of a CADD system (Hard Drive, Monitor, Keyboard and USB ports.) .

• ET100 SLO2 - Perform commands on a CADD system to create engineering drawings. Commands such as construction lines, arcs, circles, arrays, layers, multiline text, properties, etc.

• ET100 SLO3 - Develop familiarity with the principles and application of engineering drawing, including, freehand sketching, engineering lettering, dimensioning, sections, surface finish, standard tolerancing, threads, and fasteners. Ability to incorporate the above into an engineering drawing using input commands.

• ET100 SLO4 - Develop graphic communication skills including orthographic projection; detail and assembly drawings; auxiliaries; sections; dimensioning; and surface development. This to include Performing various manipulation commands on a CADD system.

• ET100 SLO5 - Develop the ability to use engineering handbooks, ordinances, codes and incorporate such regulations with engineering design and production decisions. Perform commands so as to secure hardcopies from a printing devise of such drawings and specifications.

• ET100 SLO6 - Develop the ability to read engineering drawings and specifications. Perform commands so as to secure hard copies from a printing devise of such drawings and specifications.

• ET100 SLO7 - Develop the ability to understand the intent of the engineer by interpreting the relationship of the two-dimensional drawings with respect to the actual objects or projects.

ET117 - Print Reading & Interpretation

• ET117 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

• ET117 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

• ET117 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

• ET117 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

• ET117 SLO5 - Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.

• ET117 SLO6 - Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

• ET117 SLO7 - Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

ET140 - Engineering Drawing

• ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.

• ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.

• ET140 SLO3 - Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.

• ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.

• ET140 SLO5 - Develop the understanding of geometric dimensioning and tolerancing. Understand symbols and application.

• ET140 SLO6 - Be able to create an assembly drawing project to completion. To include creation of a bill of material.

• ET140 SLO7 - Be able to use a 3D CADD program to create simple 3D models.

ET145 - Advanced Engineering Drawing

• ET145 SLO1 - Develop advanced compilation skills required to complete an engineering drawing . Compile data such as heat treatment, non- destructive testing, material specification, ect.. and incorporate into an advanced engineering drawing.

• ET145 SLO2 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete and advanced engineering drawings. CADD Software to include both 2D & 3D.

• ET145 SLO3 - Obtain and apply all necessary drawing planning skills so at to plan and outline the steps to complete an involved project on a CADD system. Drawing planning to include title and tolerance blocks, notations, multi view drawing set-up and complete dimensioning, both general and advanced geometric dimensioning and tolerancing.

• ET145 SLO4 - Use advanced CADD skills to produce 2D and 3D engineering drawings. 3D drawings to include use of assembly tools such as mates to construct 3D assemblies.

• ET145 SLO5 - Apply advanced general and geometric tolerancing to an engineering drawing to fit two or more parts. Fully understand GD&T symbols and application to parts and assemblies.

• ET145 SLO6 – Develop a complete drawing portfolio for use on a job interview. Portfolio contents to include drawing assignments from current and previous engineering drawing courses.

ET160 - Digital Tools in Architecture

• ET160 SLO1 - Develop graphic communication skills using digital media.

• ET160 SLO2 - Edit and enhance digital images.

• ET160 SLO3 - Create and edit various two and three- dimensional digital models.

• ET160 SLO4 - Create digital presentation documents.

• ET160 SLO5 - Share and convert digital files.

ET300 - Shop Math and Measurement

• ET300 SLO1 - Solve problems dealing with fractions, percentage, ratio.

• ET300 SLO2 - Understand and interpret decimal numbers and fractions.

• ET300 SLO3 - Select the correct method for solving an applied problem using mathematics.

• ET300 SLO4 - Define the properties of basic geometric shapes.

• ET300 SLO5 - Identify locations using the Cartesian coordinate system.

• ET300 SLO6 - Use a variety of basic and precision measuring tools.

ET330 - Print Reading & Interpretation

• ET330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

• ET330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

• ET330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

• ET330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.

• ET330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.

• ET330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.

• ET330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

MT330 - Print Reading & Interpretation

• MT330 SLO1 - Obtain skills in sketching in order to communicate an idea. Identify the various lines and letter types on an engineering drawing.

• MT330 SLO2 - Understand the use of scales and precision measuring tools. Obtain basic knowledge of manufacturing materials and processes.

• MT330 SLO3 - Use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.

- MT330 SLO4 - Use related handbooks, codes, and other references as they may be needed to solve a print reading question.
- MT330 SLO5 – Be able to read engineering drawings which have multi-views and auxiliary views. Understand multi-view projection. Obtain the skills to read drawings that include section views. Read working/assembly drawings.
- MT330 SLO6 – Ability to read and interpret drawing with fasteners & weld symbols. Be able to read prints with cam, gear, & bearings details.
- MT330 SLO7 –Ability to read and interpret General dimensioning and tolerancing as well as geometric dimensioning and tolerancing.

ADVISORY COMMITTEE

Engineering Technology

Roberto Adames, Civil Engineer
Adames Design Group

Tim Breschini, Engineer
Mafi Trench

Leroy Cadena, Senior Civil Engineer
MNS Engineers

Dan Howard, Instructor
Pioneer Valley High School – Industrial Arts

Engineering Technology Curriculum Agreements

COURSE REVIEW VERIFICATION (CROSS LISTED)

The table below contains several cross-listed ET courses with comments and recommendations regarding each course.

Course	Title	Cross Listed	Comments	Recommendations
ET 104	Intro to Robotics & Mechatronics	CEL 104 EL 104	The EL program is the originator of this course.	The EL program to keep this course up to date.
ET 128	Renewable Energy	CEL 128 EL 128	This course has not been offered for over 15 years.	Consult with electronics regarding the removal of course from catalogue
ET 131	PLC's & Industrial Control Design	CEL 131 EL 131	The EL program is the originator of this course.	The EL program to keep this course up to date.
ET 133	Mechatronics Systems 1	CEL 133 EL 133	The EL program is the originator of this course.	The EL program to keep this course up to date.
ET 139	Electrical Power, Motors & Controls	CEL 139 EL 139	The EL program is the originator of this course.	The EL program to keep this course up to date.
ET 162	Fluid Power & Control	CEL 162 EL 162	This course has not been offered for over 15 years.	Consult with electronics regarding the removal of course from catalogue

Articulation Agreement by Major
Effective during the 16-17 Academic Year

To: **Cal Poly San Luis Obispo**		From: **Allan Hancock College**	
15-17 General Catalog	Quarter	16-17 General Catalog	Semester

====Agricultural Systems Management, B.S.====

College of Agriculture, Food & Environmental Sciences
Bachelor of Science (B.S.) Degree

BY MAJOR:

This major articulation does not contain upper-division or general education coursework necessary for completion of this degree. Refer to the current Cal Poly catalog for further information at:

http://www.catalog.calpoly.edu

It is essential that students considering transferring to Cal Poly SLO first review major-specific Transfer Selection Criteria located at:

http://admissions.calpoly.edu/applicants/transfer/criteria.html

In subsequently consulting ASSIST, note that information on courses outlined in Transfer Selection Criteria may be located either under Articulation Agreements by Major, or Articulation Agreements by Department.

The information provided herein is subject to change without notice and does not constitute a contract or the terms and conditions of a contract between the student and the institution or the California State University.

MAJORS MAY REQUIRE: MAJOR COURSES, CONCENTRATION COURSES AND SUPPORT COURSES

--- Major Courses ---

BRAE 128	Careers in Bioresource and Agricultural Engineering	(2)	No Articulation Established
BRAE 129	Laboratory Skills and Safety	(1)	No Articulation Established
BRAE 133	Introduction to Engineering Design Graphics	(1)	No Articulation Established

Agricultural Systems Management, B.S. (continued)

BRAE 141	Agricultural Machinery Safety	(3)	No Articulation Established		
BRAE 142	Agricultural Power and Machinery Mangement	(4)	No Articulation Established		
BRAE 151	CAD for Agricultural Engineering	(1)	ET 100	Computer Aided Drafting and Design	(3)
BRAE 152	3-D Solids Modeling	(1)	No Articulation Established		
BRAE 203	Agricultural Systems Analysis	(4)	No Articulation Established		
BRAE 237	Introduction to Engineering Surveying	(2)	No Articulation Established		
	OR		**OR**		
BRAE 239	Engineering Surveying	(4)	No Articulation Established		

Approved Electives (15 units)
(Minimum 6 units at upper division level, no more than 4 units internship or enterprise)

The elective list is extensive - see 2015-2017 catalog for more details.

--- **Support Courses** ---

AGB 212	Agricultural Economics	(4)	No Articulation Established		
AGB 214	Agribusiness Financial Accounting	(4)	No Articulation Established		
	OR		**OR**		
BUS 212	Financial Accounting for Nonbusiness Majors	(4)	ACCT 100	Accounting for Entrepreneurs	(3)
CHEM 110	World of Chemistry	(4)	CHEM 150	General Chemistry 1	(5)
			OR		
			CHEM 110	Chemistry and Society	(4)
			OR		
			CHEM 120	Introductory Chemistry	(4)
	OR		**OR**		
CHEM 111	Survey of Chemistry	(5)	CHEM 150	General Chemistry 1	(5)
ENGL 145	Reasoning, Argumentation, and Writing	(4)	No Articulation Established		
Same as:	COMS 145, HNRS 145				
	OR		**OR**		

Agricultural Systems Management, B.S. (continued)

ENGL 148	Reasoning, Argumentation and Professional Writing Same as: HNRS 148	(4)	ENGL 103	Critical Thinking and Composition	(3)
MATH 119	Pre-Calculus Trigonometry	(4)	MATH 121	Trigonometry	(3)
			OR		
			MATH 141	Precalculus	(6)
	OR			OR	
STAT 217	Introduction to Statistical Concepts and Methods	(4)	MATH 123	Elementary Statistics	(4)
	OR			OR	
STAT 218	Applied Statistics for the Life Sciences	(4)	MATH 123	Elementary Statistics	(4)
MATH 221	Calculus for Business and Economics	(4)	MATH 135	Calculus with Applications	(4)
PHYS 121	College Physics I	(4)	PHYS 141	General Physics 1	(4)
SS 121	Introductory Soil Science	(4)	AG 125	Soils and Plant Nutrition	(4)
Approved Substitution for Course Credit - No GE Credit given					
	Animal or Plant Production Course	(3)			
Lower-division electives:			Any AEPS, ASCI, DSCI course except for internship or enterprise courses are acceptable		

This information is effective for the academic year (Fall to Summer) 2016-2017. Credit is extended based on the academic year in which the transfer course was taken. Major programs are dynamic and requirements are subject to change.

END OF MAJOR

Articulation Agreement by Major
Effective during the 16-17 Academic Year

To: **Cal Poly San Luis Obispo**		From: **Allan Hancock College**	
15-17 General Catalog	Quarter	16-17 General Catalog	Semester

====Architectural Engineering, B.S.====

College of Architecture and Environmental Design
Bachelor of Science (B.S) Degree

BY MAJOR:

This major articulation does not contain upper-division or general education coursework necessary for completion of this degree. Refer to the current Cal Poly catalog for further information at:

http://www.catalog.calpoly.edu

It is essential that students considering transferring to Cal Poly SLO first review major-specific Transfer Selection Criteria located at:

http://admissions.calpoly.edu/applicants/transfer/criteria.html

In subsequently consulting ASSIST, note that information on courses outlined in Transfer Selection Criteria may be located either under Articulation Agreements by Major, or Articulation Agreements by Department.

The information provided herein is subject to change without notice and does not constitute a contract or the terms and conditions of a contract between the student and the institution or the California State University.

MAJORS MAY REQUIRE: MAJOR COURSES, CONCENTRATION COURSES AND SUPPORT COURSES

--- Major Courses ---

ARCE 106	Introduction to Building Systems	(2)	No Articulation Established		
ARCE 211	Structures I	(3)	No Articulation Established		
ARCE 212	Structures II	(3)	No Articulation Established		
ARCE 211 &	Structures I	(3)	ENGR 152 &	Statics	(3)
ARCE 212	Structures II	(3)	ENGR 156	Strength of Materials	(4)

Architectural Engineering, B.S. (continued)

ARCE 223 &	Mechanics of Structural Members	(3)	No Articulation Established		
ARCE 224	Mechanics of Structural Members Laboratory	(1)			
ARCE 225	Dynamics	(3)	ENGR 154	Dynamics	(3)
	OR			**OR**	
ME 212	Engineering Dynamics	(3)	ENGR 154	Dynamics	(3)
ARCE 227	Structures III	(2)	No Articulation Established		
ARCE 257	Structural CAD for Building Design	(2)	ARCH 160	Digital Tools for Architecture	(3)
			Same as: ET 160		
			OR		
			ET 160	Digital Tools for Architecture	(3)
			Same as: ARCH 160		

--- **Support Courses** ---

@ ARCH 131 &	Design and Visual Communication 1.1	(4)	ARCH 111 &	Graphics and Design Studio 1	(3)
ARCH 132 &	Design and Visual Communication 1.2	(4)	ARCH 112 &	Graphics and Design Studio 2	(3)
ARCH 133	Design and Visual Communication 1.3	(4)	ARCH 160	Digital Tools for Architecture	(3)
			Same as: ET 160		
ARCH 217	History of World Architecture: Prehistory-Middle Ages	(4)	No Articulation Established		
	OR			**OR**	
ARCH 218	History of World Architecture: Middle Ages- 18th Century	(4)	No Articulation Established		
	OR			**OR**	
ARCH 219	History of World Architecture: 18th Century- Present	(4)	No Articulation Established		
	OR			**OR**	
ARCE 260	History of Structures	(4)	No Articulation Established		

@ (Credit subject to portfolio review)

Architectural Engineering, B.S. (continued)

BRAE 237	Introduction to Engineering Surveying	(2)	No Articulation Established		
CHEM 124	General Chemistry for Physical Science and Engineering I	(4)	CHEM 150	General Chemistry 1	(5)
CM 115	Fundamentals of Construction Management	(6)	No Articulation Established		
CM 232	Evaluation of Cost Alternatives	(3)	No Articulation Established		
CSC 231	Programming for Engineering Students	(2)	No Articulation Established		
EE 201	Electric Circuit Theory	(3)	ENGR 170	Electric Circuit Analysis	(3)
GEOL 201	Physical Geology	(3)	GEOL 100	Physical Geology	(4)
MATH 141 Same as: HNRS 141	Calculus I	(4)	MATH 181	Calculus 1	(5)
MATH 142 Same as: HNRS 142	Calculus II	(4)	MATH 182	Calculus 2	(5)
MATH 143 Same as: HNRS 143	Calculus III	(4)	MATH 182	Calculus 2	(5)
MATH 141 & Same as: HNRS 141 MATH 142 Same as: HNRS 142	Calculus I Calculus II	(4) (4)	MATH 181 & MATH 182	Calculus 1 Calculus 2	(5) (5)
MATH 141 & Same as: HNRS 141 MATH 142 & Same as: HNRS 142 MATH 143 Same as: HNRS 143	Calculus I Calculus II Calculus III	(4) (4) (4)	MATH 181 & MATH 182	Calculus 1 Calculus 2	(5) (5)

Architectural Engineering, B.S. (continued)

MATH 141 &	Calculus I	(4)	MATH 181 &	Calculus 1	(5)
Same as: HNRS 141			MATH 182 &	Calculus 2	(5)
MATH 142 &	Calculus II	(4)	MATH 183	Multivariable Calculus	(5)
Same as: HNRS 142					
MATH 143 &	Calculus III	(4)			
Same as: HNRS 143					
MATH 241	Calculus IV	(4)			
Same as: HNRS 241					
MATH 241	Calculus IV	(4)	MATH 183	Multivariable Calculus	(5)
Same as: HNRS 241					
MATH 244	Linear Analysis I	(4)	MATH 184	Linear Algebra and Differential Equations	(5)
Same as: HNRS 244					
PHYS 141	General Physics IA	(4)	PHYS 161	Engineering Physics 1	(5)
Same as: HNRS 134					
PHYS 132	General Physics II	(4)	PHYS 162	Engineering Physics 2	(5)
Same as: HNRS 132					
PHYS 133	General Physics III	(4)	PHYS 163	Engineering Physics 3	(5)
PHYS 141 &	General Physics IA	(4)	PHYS 161 &	Engineering Physics 1	(5)
Same as: HNRS 134			PHYS 162	Engineering Physics 2	(5)
PHYS 132	General Physics II	(4)			
Same as: HNRS 132					
PHYS 141 &	General Physics IA	(4)	PHYS 161 &	Engineering Physics 1	(5)
Same as: HNRS 134			PHYS 162 &	Engineering Physics 2	(5)
PHYS 132 &	General Physics II	(4)	PHYS 163	Engineering Physics 3	(5)
Same as: HNRS 132					
PHYS 133	General Physics III	(4)			

This information is effective for the academic year (Fall to Summer) 2016-2017. Credit is extended based on the academic year in which the transfer course was taken. Major programs are dynamic and requirements are subject to change.

END OF MAJOR

Articulation Agreement by Major
Effective during the 16-17 Academic Year

To: **Cal Poly San Luis Obispo**		From: **Allan Hancock College**	
15-17 General Catalog	Quarter	16-17 General Catalog	Semester

====Civil Engineering, B.S.====

College of Engineering
Bachelor of Science (B.S.) Degree

BY MAJOR:

This major articulation does not contain upper-division or general education coursework necessary for completion of this degree. Refer to the current Cal Poly catalog for further information at:

http://www.catalog.calpoly.edu

It is essential that students considering transferring to Cal Poly SLO first review major-specific Transfer Selection Criteria located at:

http://admissions.calpoly.edu/applicants/transfer/criteria.html

In subsequently consulting ASSIST, note that information on courses outlined in Transfer Selection Criteria may be located either under Articulation Agreements by Major, or Articulation Agreements by Department.

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MAJORS MAY REQUIRE: MAJOR COURSES, CONCENTRATION COURSES AND SUPPORT COURSES

--- Major Courses ---

CE 111	Introduction to Civil Engineering	(1)	No Articulation Established		
CE 112	Design Principles in Civil Engineering	(2)	No Articulation Established		
CE 113	Computer Aided Drafting in Civil Engineering	(2)	ET 100	Computer Aided Drafting and Design	(3)
CE 204	Mechanics of Materials I	(3)	No Articulation Established		

Civil Engineering, B.S. (continued)

CE 207	Mechanics of Materials II	(2)	No Articulation Established		
CE 204 &	Mechanics of Materials I	(3)	ENGR 156	Strength of Materials	(4)
CE 207	Mechanics of Materials II	(2)			
CE 251	Programming Applications in Engineering	(2)	No Articulation Established		
CE 259	Civil Engineering Materials	(2)	No Articulation Established		

--- **Support Courses** ---

BIO 213 &	Life Science for Engineers	(2)	BIOL 100	Introductory Biology	(4)
			OR		
BRAE 213	Bioengineering Fundamentals	(2)	BIOL 150	Cellular Biology	(5)
Same as:	BMED 213				
	OR			**OR**	
BIO 213 &	Life Science for Engineers	(2)	BIOL 100	Introductory Biology	(4)
			OR		
BMED 213	Bioengineering Fundamentals	(2)	BIOL 150	Cellular Biology	(5)
Same as:	BRAE 213				
BRAE 239	Engineering Surveying	(4)	No Articulation Established		
CHEM 124	General Chemistry for Physical Science and Engineering I	(4)	CHEM 150	General Chemistry 1	(5)
CHEM 125	General Chemistry for Physical Science and Engineering II	(4)	CHEM 151	General Chemistry 2	(5)
CHEM 124 &	General Chemistry for Physical Science and Engineering I	(4)	CHEM 150 &	General Chemistry 1	(5)
			CHEM 151	General Chemistry 2	(5)
CHEM 125	General Chemistry for Physical Science and Engineering II	(4)			
ENGL 149	Technical Writing for Engineers	(4)	ENGL 104	Technical Writing	(3)
Same as:	HNRS 149				

Credit for ENGL 149 will be granted only when a student has also passed one CSU-approved GE area A3 course, **in addition** to ENGL 104.

Civil Engineering, B.S. (continued)

GEOL 201	Physical Geology	(3)	GEOL 100	Physical Geology	(4)
MATE 210 & MATE 215	Materials Engineering Materials Laboratory I	(3) (1)	ENGR 161 & ENGR 162	Materials Science Materials Science Lab	(3) (1)
MATE 210	Materials Engineering	(3)	ENGR 161	Materials Science	(3)
MATE 215	Materials Laboratory I	(1)	ENGR 162	Materials Science Lab	(1)
MATH 141 Same as: HNRS 141	Calculus I	(4)	MATH 181	Calculus 1	(5)
MATH 142 Same as: HNRS 142	Calculus II	(4)	MATH 182	Calculus 2	(5)
MATH 143 Same as: HNRS 143	Calculus III	(4)	MATH 182	Calculus 2	(5)
MATH 241 Same as: HNRS 241	Calculus IV	(4)	MATH 183	Multivariable Calculus	(5)
MATH 141 & Same as: HNRS 141 MATH 142 Same as: HNRS 142	Calculus I Calculus II	(4) (4)	MATH 181 & MATH 182	Calculus 1 Calculus 2	(5) (5)
MATH 141 & Same as: HNRS 141 MATH 142 & Same as: HNRS 142 MATH 143 Same as: HNRS 143	Calculus I Calculus II Calculus III 	(4) (4) (4) 	MATH 181 & MATH 182	Calculus 1 Calculus 2	(5) (5)
MATH 141 & Same as: HNRS 141 MATH 142 & Same as: HNRS 142 MATH 143 & Same as: HNRS 143 MATH 241 Same as: HNRS 241	Calculus I Calculus II Calculus III Calculus IV 	(4) (4) (4) (4) 	MATH 181 & MATH 182 & MATH 183	Calculus 1 Calculus 2 Multivariable Calculus	(5) (5) (5)
MATH 244 Same as: HNRS 244	Linear Analysis I	(4)	MATH 184	Linear Algebra and Differential Equations	(5)
ME 211	Engineering Statics	(3)	ENGR 152	Statics	(3)
ME 212	Engineering Dynamics	(3)	ENGR 154	Dynamics	(3)

Civil Engineering, B.S. (continued)

PHYS 141	General Physics IA	(4)	PHYS 161	Engineering Physics 1	(5)
Same as: HNRS 134					
PHYS 141 &	General Physics IA	(4)	PHYS 161 &	Engineering Physics 1	(5)
Same as: HNRS 134			PHYS 162	Engineering Physics 2	(5)
PHYS 132	General Physics II	(4)			
Same as: HNRS 132					
PHYS 141 &	General Physics IA	(4)	PHYS 161 &	Engineering Physics 1	(5)
Same as: HNRS 134			PHYS 162 &	Engineering Physics 2	(5)
PHYS 132 &	General Physics II	(4)	PHYS 163	Engineering Physics 3	(5)
Same as: HNRS 132					
PHYS 133	General Physics III	(4)			
PHYS 132	General Physics II	(4)	PHYS 162	Engineering Physics 2	(5)
Same as: HNRS 132					
PHYS 133	General Physics III	(4)	PHYS 163	Engineering Physics 3	(5)

Approved Engineering Science Elective (2-4 units)
Select from (only lower division listed here):

CSC 231	Programming for Engineering Students	(2)	No Articulation Established		
CSC 234	C and UNIX	(3)	CS 111	Fundamentals of Programming 1	(4)
EE 201	Electric Circuit Theory	(3)	ENGR 170	Electric Circuit Analysis	(3)

This information is effective for the academic year (Fall to Summer) 2016-2017. Credit is extended based on the academic year in which the transfer course was taken. Major programs are dynamic and requirements are subject to change.

END OF MAJOR

Articulation Agreement by Major
Effective during the 16-17 Academic Year

To: **Cal Poly San Luis Obispo**		From: **Allan Hancock College**	
15-17 General Catalog	Quarter	16-17 General Catalog	Semester

====Industrial Engineering, B.S.====
College of Engineering
Bachelor of Science (B.S.)Degree

BY MAJOR:

This major articulation does not contain upper-division or general education coursework necessary for completion of this degree. Refer to the current Cal Poly catalog for further information at:

http://www.catalog.calpoly.edu

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MAJORS MAY REQUIRE: MAJOR COURSES, CONCENTRATION COURSES AND SUPPORT COURSES

--- Major Courses ---

IME 101	Introduction to Industrial and Manufacturing Engineering	(1)	No Articulation Established
IME 140	Graphics Communication and Modeling	(2)	No Articulation Established
IME 141	Manufacturing Processes: Net Shape	(1)	No Articulation Established

Industrial Engineering, B.S. (continued)

IME 144	Introduction to Design and Manufacturing	(4)	No Articulation Established		
IME 156	Basic Electronics Manufacturing	(2)	No Articulation Established		
IME 223	Process Improvement Fundamentals	(4)	No Articulation Established		
IME 239	Industrial Costs and Controls	(3)	No Articulation Established		

Technical Electives (10 units)
(Minimum of 6 units of engineering or computer science courses at 300-400 level)
Select from (only lower division listed here):

CE 207	Mechanics of Materials II	(2)	No Articulation Established		
IME 142	Manufacturing Processes: Materials Joining	(2)	WLDT 106	Beginning Welding	(3)

--- **Support Courses** ---

BIO 213 &	Life Science for Engineers	(2)	BIOL 100	Introductory Biology	(4)
			OR		
BRAE 213	Bioengineering Fundamentals	(2)	BIOL 150	Cellular Biology	(5)
Same as:	BMED 213				
	OR			OR	
BIO 213 &	Life Science for Engineers	(2)	BIOL 100	Introductory Biology	(4)
			OR		
BMED 213	Bioengineering Fundamentals	(2)	BIOL 150	Cellular Biology	(5)
Same as:	BRAE 213				
CE 204	Mechanics of Materials I	(3)	No Articulation Established		
CHEM 124	General Chemistry for Physical Science and Engineering I	(4)	CHEM 150	General Chemistry 1	(5)
CSC 232	Computer Programming for Scientists and Engineers	(3)	No Articulation Established		
EE 201	Electric Circuit Theory	(3)	ENGR 170	Electric Circuit Analysis	(3)
	AND			AND	

To: Cal Poly San Luis Obispo, From: Allan Hancock College, 16-17

Industrial Engineering, B.S. (continued)

EE 251	Electric Circuits Laboratory	(1)	ENGR 171	Electric Circuits Laboratory	(1)
ENGL 149	Technical Writing for Engineers	(4)	ENGL 104	Technical Writing	(3)
Same as: HNRS 149					

Credit for ENGL 149 will be granted only when a student has also passed one CSU-approved GE area A3 course, **in addition** to ENGL 104.

MATH 141	Calculus I	(4)	MATH 181	Calculus 1	(5)
Same as: HNRS 141					
MATH 142	Calculus II	(4)	MATH 182	Calculus 2	(5)
Same as: HNRS 142					
MATH 143	Calculus III	(4)	MATH 182	Calculus 2	(5)
Same as: HNRS 143					
MATH 241	Calculus IV	(4)	MATH 183	Multivariable Calculus	(5)
Same as: HNRS 241					
MATH 244	Linear Analysis I	(4)	MATH 184	Linear Algebra and Differential Equations	(5)
Same as: HNRS 244					
MATH 141 &	Calculus I	(4)	MATH 181 &	Calculus 1	(5)
Same as: HNRS 141			MATH 182	Calculus 2	(5)
MATH 142	Calculus II	(4)			
Same as: HNRS 142					
MATH 141 &	Calculus I	(4)	MATH 181 &	Calculus 1	(5)
Same as: HNRS 141			MATH 182	Calculus 2	(5)
MATH 142 &	Calculus II	(4)			
Same as: HNRS 142					
MATH 143	Calculus III	(4)			
Same as: HNRS 143					
MATH 141 &	Calculus I	(4)	MATH 181 &	Calculus 1	(5)
Same as: HNRS 141			MATH 182 &	Calculus 2	(5)
MATH 142 &	Calculus II	(4)	MATH 183	Multivariable Calculus	(5)
Same as: HNRS 142					
MATH 143 &	Calculus III	(4)			
Same as: HNRS 143					
MATH 241	Calculus IV	(4)			
Same as: HNRS 241					
ME 211	Engineering Statics	(3)	ENGR 152	Statics	(3)
ME 212	Engineering Dynamics	(3)	ENGR 154	Dynamics	(3)

Industrial Engineering, B.S. (continued)

MATE 210	Materials Engineering	(3)	ENGR 161	Materials Science	(3)
MATE 215	Materials Laboratory I	(1)	ENGR 162	Materials Science Lab	(1)
MATE 210 &	Materials Engineering	(3)	ENGR 161 &	Materials Science	(3)
MATE 215	Materials Laboratory I	(1)	ENGR 162	Materials Science Lab	(1)
PHYS 141	General Physics IA	(4)	PHYS 161	Engineering Physics 1	(5)
Same as: HNRS 134					
PHYS 132	General Physics II	(4)	PHYS 162	Engineering Physics 2	(5)
Same as: HNRS 132					
PHYS 133	General Physics III	(4)	PHYS 163	Engineering Physics 3	(5)
PHYS 141 &	General Physics IA	(4)	PHYS 161 &	Engineering Physics 1	(5)
Same as: HNRS 134			PHYS 162	Engineering Physics 2	(5)
PHYS 132	General Physics II	(4)			
Same as: HNRS 132					
PHYS 141 &	General Physics IA	(4)	PHYS 161 &	Engineering Physics 1	(5)
Same as: HNRS 134			PHYS 162 &	Engineering Physics 2	(5)
PHYS 132 &	General Physics II	(4)	PHYS 163	Engineering Physics 3	(5)
Same as: HNRS 132					
PHYS 133	General Physics III	(4)			
PSY 201	General Psychology	(4)	PSY 101	General Psychology	(3)
	OR			**OR**	
PSY 202	General Psychology	(4)	PSY 101	General Psychology	(3)

This information is effective for the academic year (Fall to Summer) 2016-2017. Credit is extended based on the academic year in which the transfer course was taken. Major programs are dynamic and requirements are subject to change.

END OF MAJOR

Articulation Agreement by Major
Effective during the 16-17 Academic Year

To: **Cal Poly San Luis Obispo**		From: **Allan Hancock College**	
15-17 General Catalog	Quarter	16-17 General Catalog	Semester

====Mechanical Engineering, B.S.====

College of Engineering

Bachelor of Science (B.S.) Degree

BY MAJOR:

This major articulation does not contain upper-division or general education coursework necessary for completion of this degree. Refer to the current Cal Poly catalog for further information at:

http://www.catalog.calpoly.edu

It is essential that students considering transferring to Cal Poly SLO first review major-specific Transfer Selection Criteria located at:

http://admissions.calpoly.edu/applicants/transfer/criteria.html

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MAJORS MAY REQUIRE: MAJOR COURSES, CONCENTRATION COURSES AND SUPPORT COURSES

--- Major Courses ---

ME 128	Introduction to Mechanical Engineering I	(1)	No Articulation Established		
ME 129	Introduction to Mechanical Engineering II	(1)	No Articulation Established		
ME 130	Introduction to Mechanical Engineering III	(1)	ET 145	Advanced Engineering Drawing	(3)

Mechanical Engineering, B.S. (continued)

EE 201 &	Electric Circuit Theory	(3)	ENGR 170 &	Electric Circuit Analysis	(3)
EE 251	Electric Circuits Laboratory	(1)	ENGR 171	Electric Circuits Laboratory	(1)
ENGL 149	Technical Writing for Engineers Same as: HNRS 149	(4)	ENGL 104	Technical Writing	(3)
IME 142	Manufacturing Processes: Materials Joining	(2)	WLDT 106	Beginning Welding	(3)
IME 143	Manufacturing Processes: Material Removal	(2)	MT 109	Survey of Machining	(4)
MATE 210	Materials Engineering	(3)	ENGR 161	Materials Science	(3)
MATE 215	Materials Laboratory I	(1)	ENGR 162	Materials Science Lab	(1)
MATE 210 &	Materials Engineering	(3)	ENGR 161 &	Materials Science	(3)
MATE 215	Materials Laboratory I	(1)	ENGR 162	Materials Science Lab	(1)
MATH 141	Calculus I Same as: HNRS 141	(4)	MATH 181	Calculus 1	(5)
MATH 142	Calculus II Same as: HNRS 142	(4)	MATH 182	Calculus 2	(5)
MATH 143	Calculus III Same as: HNRS 143	(4)	MATH 182	Calculus 2	(5)
MATH 241	Calculus IV Same as: HNRS 241	(4)	MATH 183	Multivariable Calculus	(5)
MATH 244	Linear Analysis I Same as: HNRS 244	(4)	MATH 184	Linear Algebra and Differential Equations	(5)
MATH 141 &	Calculus I Same as: HNRS 141	(4)	MATH 181 &	Calculus 1	(5)
MATH 142	Calculus II Same as: HNRS 142	(4)	MATH 182	Calculus 2	(5)

Credit for ENGL 149 will be granted only when a student has also passed one CSU-approved GE area A3 course, **in addition** to ENGL 104.

Mechanical Engineering, B.S. (continued)

MATH 141 &	Calculus I	(4)	MATH 181 &	Calculus 1	(5)
Same as: HNRS 141			MATH 182	Calculus 2	(5)
MATH 142 &	Calculus II	(4)			
Same as: HNRS 142					
MATH 143	Calculus III	(4)			
Same as: HNRS 143					

MATH 141 &	Calculus I	(4)	MATH 181 &	Calculus 1	(5)
Same as: HNRS 141			MATH 182 &	Calculus 2	(5)
MATH 142 &	Calculus II	(4)	MATH 183	Multivariable Calculus	(5)
Same as: HNRS 142					
MATH 143 &	Calculus III	(4)			
Same as: HNRS 143					
MATH 241	Calculus IV	(4)			
Same as: HNRS 241					

PHYS 131	General Physics I	(4)	PHYS 161	Engineering Physics 1	(5)
Same as: HNRS 131					
	OR			**OR**	
PHYS 141	General Physics IA	(4)	PHYS 161	Engineering Physics 1	(5)
Same as: HNRS 134					

PHYS 132	General Physics II	(4)	PHYS 162	Engineering Physics 2	(5)
Same as: HNRS 132					

PHYS 133	General Physics III	(4)	PHYS 163	Engineering Physics 3	(5)

PHYS 131 &	General Physics I	(4)	PHYS 161 &	Engineering Physics 1	(5)
Same as: HNRS 131			PHYS 162	Engineering Physics 2	(5)
PHYS 132	General Physics II	(4)			
Same as: HNRS 132					

PHYS 131 &	General Physics I	(4)	PHYS 161 &	Engineering Physics 1	(5)
Same as: HNRS 131			PHYS 162 &	Engineering Physics 2	(5)
PHYS 132 &	General Physics II	(4)	PHYS 163	Engineering Physics 3	(5)
Same as: HNRS 132					
PHYS 133	General Physics III	(4)			

Manufacturing Processes Elective
Select from the following (only lower division shown):

IME 141	Manufacturing Processes: Net Shape	(1)	No Articulation Established

This information is effective for the academic year (Fall to Summer) 2016-2017. Credit is extended based on the academic year in which the transfer course was taken. Major programs are dynamic and requirements are subject to change.

END OF MAJOR

COURSE REVIEW VERIFICATION

Discipline: **Engineering Technology** Year 2018

As part of the program evaluation process, the self-study team has reviewed the course outlines supporting the discipline/program curriculum. The review process has resulted in the following recommendations:

1. The following course outlines are satisfactory as written and do not require modification (list all such courses): **ET 117, ET 145, ET 300, ET 370**

2. The following courses require minor modification to ensure currency. The self-study team anticipates submitting such modifications to the AP&P, FALL 20____ SPRING 2019
   ET 189, ET 389

3. The following courses require major modification. The self-study team anticipates submitting such modifications to the AP&P committee, FALL 2019, SPRING 2020
   ET 100, ET 140, ET 160

GRADUATION REQUIREMENTS: General Education (GE), Multicultural/Gender Studies (MCGS) and Health & Safety (H&W) Courses.

The following courses were reviewed as meeting an **AHC GE** requirement. The AP&P GE Criteria and Category Definitions (GE Learning Outcomes) forms were submitted to the AP&P for review on: _____

The following courses were reviewed as meeting the **MCGS** requirement. The AP&P MCGS Criteria and Category Definitions (MCGS Learning Outcomes – To Be Developed) forms were submitted to the AP&P for review on:

_____

The following courses were reviewed as meeting the **H&W** requirement. The AP&P H&W Studies Criteria (To Be Developed) and Category Definitions (H&W Learning Outcomes – To Be Developed) forms were submitted to the AP&P chair for review on: _____

Course Review Team Members:

Saad Sadig — Signature — 4/30/2018 Date

Tim Breschini — Signature — 4/30/2018 Date

Jonas Sturas — Signature — 5/1/2018 Date

Larry Manalo — Signature AP&P Chair — 5/1/2018 Date

Margaret Lau — Signature Academic Dean — 5/4/2018 Date

Review of Prerequisites, Co requisites, and Advisories

Course Prefix No	CURRENT Prerequisite/Co-requisite /Advisory/Limitation on Enrolment	LEVEL OF SCRUTINY (Statistics, Content Review, UC/CSU Comparison, Student Survey-list all)	RESULT (i.e., current PCA is established, should be dropped/modified or new PCA is established)	ACTION TO BETAKEN (None, APP-Major or Minor)
ET 100	None	Content Review	N/A	None
ET 117	None	Content Review	N/A	None
ET 140	ET 100	Content Review	N/A	None
ET 145	ET 140	Content Review	N/A	None
ET 300	None	Content Review	N/A	None

DEGREE AND CERTIFICATE REQUIREMENTS

Engineering Technology (A.S.)

CS 111	Fundamentals of Programming 1	4
ET 100	Computer Aided Drafting and Design	3
ET 140	Engineering Drawing	3
ET 145	Advanced Engineering Drawing	3
ET 117	Print Reading and Interpretation	3
PHY 141	General Physics 1	4
PHY 142	General Physics 2	4

Civil Engineering Technology (A.S.)

Arch 131	Building Construction Materials & Methods	3
ENGR152	Statics	3
GEO 100	Physical Geology	4
MATH 181	Calculus 1	4
PHY 142	General Physics 2	4
PHY 142	General Physics 2	4

Engineering Technology (Certificate of Accomplishment)

ET 100	Computer Aided Drafting and Design	3
ET 140	Engineering Drawing	3
ET 145	Advanced Engineering Drawing	3
ET 117	Print Reading and Interpretation	3

Plus a minimum of 3 units selected from the following

ARCH 111	Architectural Graphics and Design 1	3
ARCH 121	Architectural Drawing 1	3
ARCH 122	Architectural Drawing 2	4
ET 189	Independent Projects in Engineering Technology	1-3
ET 370	Skills USA	3

Engineering Technology: Mechatronics (A.S. & Certificate of Achievement)

CS 111	Fundamentals of Programming 1	4
EL/CEL/ET 104	Introduction to Robotics & Mechatronics	3
EL 122	Electronic Devices and Circuits	3
EL 123	Electronic Devices and Circuits Lab	2
CS 141	Computer Fundamentals in Digital Design	3

OR

EL 125	Digital Devices and Circuits	3
CS 142	Computer Fundamentals in Digital Design Lab	2

OR

EL 126	Digital Devices and Circuits Lab	2
MT 330	Print Reading and Interpretation	3

OR

WLDT 306	Layout and Fabrication Interpretation	3
MT 330	Print Reading and Interpretation	3
EL 146	Electronic Product Design, Fabrication and Documentation	2
MT 109	Survey of Machining	4
ET 140	Engineering Drawing	3
SP 128	Materials and Processes	3

Plus a minimum of 15 units selected from the following

CS 137	Microcomputer Architecture and Software Design	4
CS 175	Object-Oriented Programming	3
CS 164	Software Engineering	3
EL 105	PC Preventive Maintenance and Upgrade	3

OR

EL 320	A+ Certification	2
EL 106	Networking Essentials 1	3
EL 107	Networking Essentials 2	3
EL/CEL/ET 128	Renewable Energy	3
EL/CEL/ET 131	Programmable Logic Controllers and Industrial Control Design	3
EL/CEL/ET 133	Transducers and Sensors	3
EL 135	Electronic Measurement & Instrumentation	3
EL 136	Electronic Measurement & Instrumentation Lab	2
EL/ET 138	Introduction to Motorola's 68000 Microprocessor Family	3
EL/CEL/ET 139	Electrical Power, Motors, and Controls	3
EL/CEL/ET 162	Fluid Power and Control	2
ET 100	Computer Aided Drafting and Design	3
MT 100	Machine Tool Practices	4
PHYS 100	Concepts in Physics	3

OR

PHYS 110	Introductory Physics	3

OR

PHSC 111	Matter, Energy, and Molecules	4
SP 104	Quality Management Control and Safety	3
WLDT 106	Beginning Welding	3
WLDT 107	Advanced Welding	3
WLDT 307	G.M.A.W. Welding	3

OR

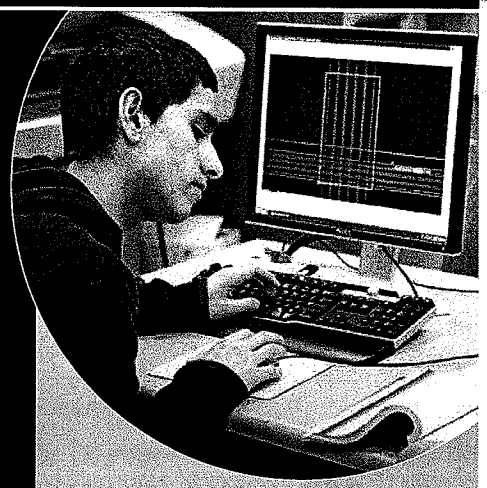
WLDT 308	T.I.G. Welding	3
WLDT 315	Metal Fabrication	3

ALLAN HANCOCK COLLEGE
800 South College Drive
Santa Maria, CA 93454-6399
(805) 922-6966
www.hancockcollege.edu

Allan Hancock College is a California public community college in northern Santa Barbara County serving more than 11,000 credit students each semester. The college offers degrees and certificates in more than 100 fields of study from accounting to welding. The college has a campus in Santa Maria and centers in Lompoc, Solvang, and at Vandenberg AFB.

rev.3/10 | rep.3/10

Engineering Technology



Career Technical Education (CTE)

Engineering Technology

Associate in Science degree in Engineering Technology options

- Engineering Technology
- Civil
- Mechatronics

Certificate of Achievement in Engineering Technology with emphasis in Mechatronics

Certificate of Accomplishment in Engineering Drafting

ALLAN HANCOCK COLLEGE
Start here. Go anywhere.

As you begin your engineering technology education at Allan Hancock College you are opening the door to many exciting careers. Each career in turn has many different opportunities within it. Whether your interest lies in theoretical problem solving, artistic creation, working with your hands or creating something practical, a degree in engineering technology will help you satisfy that interest. With your engineering technology degree you can pursue a career as a drafter, designer, civil engineer, manufacturing engineer, mechanical engineer, electrical engineer or electronic engineer, among many other options. Graduating with a degree or certificate in engineering technology from Allan Hancock College will put you well on your way to a successful career in the engineering and design industry.

Equipment and Facilities:

Our facilities include a fully-equipped Computer Aided Design and Drafting (CADD) lab with up-to-date hardware and software, a state-of-the-art 3D printer, a 42"wide plotter for larger CADD prints and, three laser printers and copier.

Employment Opportunities:

Earning an associate in science degree or a certificate in engineering technology or a certificate of accomplishment in engineering drafting from Allan Hancock College will provide you with the skills necessary to pursue a successful career in entry level positions such as:

- Engineering assistant
- Engineering technician
- Engineering drafter *(architectural, structural, aeronautical, civil, mechanical, sheet metal, electrical, electronic)*

According to the Bureau of Labor Statistics, electrical and electronic engineering technicians held 33 percent of the 497,300 jobs industry wide and earned a median annual wage $53,240 in May 2008.

Engineering Technology

The engineering technology program at Allan Hancock College will prepare you for transfer to a four-year college or for employment as a drafter or technician to support engineering or drafting operations. Engineering drafters create technical drawings and plans including architectural, structural, aeronautical, civil, mechanical, electronic, sheet metal, electrical and electronic. Potential drafting areas include aeronautical, architectural, automotive, civil, electrical, electronic, illustrative, mapping, mechanical, piping, structural and sheet metal. In addition, several major industries require engineering technologists including mining, petroleum, manufacturing, transportation, communications, and public utilities.

The associate degree and certificate options in engineering include engineering, civil, mechatronics or engineering drafting. Each emphasis focuses specifically on providing a solid background in the mechanics of each technology. Depending on which option you choose you will become skilled in the technologies of automation, robotics, machine design, CADD operations, civil engineering, surveying and more.

For more information

Engineering technology is one of the career technical education programs at Allan Hancock College within the deparment of Industrial Technology. It resides in the Engineering and Design industry sector.

Saad Sadig, instructor/coordinator
Phone: 805.922.6966 ext. 3488
ssadig@hancockcollege.edu

Or visit our website at
www.hancockcollege.edu/cte

Engineering Technology *(A.S.)*

A major of 27 units is required for the associate in science degree.

Required core courses (27 units):

ET 100	Computer Aided Drafting and Design	3 units
ET 140	Engineering Drawing	3 units
ET 145	Advanced Engineering Drawing	3 units
ET 330	Print Reading and Interpretation	3 units
ET 381	Industrial Mathematics	3 units
COM SC 121	Fundamentals of Programming 1	4 units
PHYS 141	General Physics 1	4 units
PHYS 142	General Physics 2	4 units

Plus a minimum of 7 units selected from the following:

ARCH 321	International Building Code	3 units
ART 113	Three Dimensional Design	3 units
ART 127	Painting in Watercolor 1	3 units
ART 128	Painting in Watercolor 2	3 units
ART 103	Art History Survey (Ancient to Medieval)	3 units
ART 104	Art History Survey (Renaissance to Modern)	3 units
ART 105	Art History Survey(Art of Mexico)	3 units
ET 100	Computer Aided Drafting	3 units
ENGR 152	Statics	3 units
ENGR 161	Materials Science	3 units
ENGR 162	Materials Science Lab	1 unit
GEOL 100	Physical Geology	4 units

Engineering Technology: Civil *(A.S.)*

A major of 26 units is required for the associate in science degree.

Required core courses (26 units):

ARCH 131	Materials of Construction 1	3 units
ET 381	Industrial Mathematics	3 units
ENGR 152	Statics	3 units
GEOL 100	Physical Geology	4 units
MATH 181	Calculus 1	5 units
PHYS 141	General Physics 1	4 units
PHYS 142	General Physics 2	4 units

Engineering Technology with emphasis in Mechatronics *(A.S. & Certificate of Achievement)*

A major of 52 units is required for the associate in science degree and certificate.

Required core courses (37 units):

COM SC 121	Fundamentals of Programming 1	4 units
EL/COM EL/ ET 104	Introduction to Robotics and Mechatronics	3 units
EL 111	Fundamentals of DC Circuit Analysis	1.5 units
EL 112	Fundamentals of DC Circuit Analysis Lab	1 unit
EL 113	Fundamentals of AC Circuit Analysis	1.5 units
EL 114	Fundamentals of AC Circuit Analysis Lab	1 unit
EL 122	Electronic Devices and Circuits	3 units
EL 123	Electronic Devices and Circuits Lab	2 units
COM SC 141	Computer Fundamentals in Digital Design	3 units
	or	
EL 125	Digital Devices and Circuits	3 units
COM SC 142	Computer Fundamentals in Digital Design Laboratory	2 units
	or	
EL 126	Digital Devices and Circuits Lab	2 units
MT 330	Print Reading and Interpretation	3 units
	or	
WLD T 306	Layout and Fabrication Interpretation	3 units

EL 146	Electronic Product Design, Fabrication and Documentation	2 units
MT 109	Survey of Machining	4 units
ET 140	Engineering Drawing	3 units
SPACE 128	Materials and Processes	3 units

Plus a minimum of 15 units selected from the following:

COM	Fundamentals of Programming 2	3 units
COM SC 175	Object-Oriented Programming	3 units
COM SC 164	Software Engineering	3 units
EL/COM SC 105	PC Preventive Maintenance and Upgrade	3 units
	or	
EL/COM SC 320	A+ Certification	2 units
EL/COM SC 106	Networking Essentials 1	3 units
EL/COM SC 107	Networking Essentials 2	3 units
EL/COM EL/ ET 128	Renewable Energy	3 units
EL/COM EL/ ET 131	Programmable Logic Controllers and Industrial Control Design	3 units
EL/COM EL/ ET 133	Transducers and Sensors	3 units
EL 135	Electronic Measurement and Instrumentation	3 units
EL 136	Electronic Measurement and Instrumentation Lab	2 units
EL/COM SC 137	Microcomputer Architecture and Software Design	4 units
EL/COM EL/ ET 138	Introduction to Motorola's 68000 Microprocessor Family	3 units
EL/COM EL/ ET 139	Electrical Power, Motors, and Controls	3 units
EL/COM EL/ ET 162	Fluid Power and Control	2 units
ET 100	Computer Aided Drafting and Design	3 units
MT 100	Machine Tool Practices	4 units
PHYS 100	Concepts in Physics	3 units
	or	
PHYS 110	Introductory Physics	3 units
	or	
PHY SC 111	Matter, Energy, and Molecules	4 units
SPACE 104	Quality Management Control and Safety	3 units
WLD T 106	Beginning Welding	3 units
WLD T 107	Advanced Welding	3 units
WLD T 307	G.M.A.W. Welding	3 units
	or	
WLD T 308	T.I.G. Welding	3 units
WLD T 315	Metal Fabrication	4 units

Engineering Technology - Engineering Drafting *(Certificate of Accomplishment)*

Fifteen units constitute the certificate.

Required core courses (12 units):

ET 100	Computer Aided Drafting and Design	3 units
ET 140	Engineering Drawing	3 units
ET 145	Advanced Engineering Drawing	3 units
ET 330	Print Reading and Interpretation	3 units

Plus a minimum of 3 units selected from the following:

ET 189	Independent Projects in Engineering Technology	3 units
ARCH 111	Architectural Graphics	3 units
ARCH 121	Architectural Drawing 1	4 units
ARCH 122	Architectural Drawing 2	4 units

VALIDATION

PROGRAM REVIEW -- VALIDATION TEAM MEMBERS

TO: Academic Dean Date: 11/15/2017

From: Saad Sadig

We recommend the following persons for consideration for the validation team:

DEPARTMENT Industrial Technology PROGRAM Engineering Technology

Board Policy requires that the validation team be comprised of the dean of the area, one faculty member from a related discipline/program, and two faculty members from unrelated disciplines.

Dom DalBello	Engineering
(Name)	(Related Discipline/Program)
Eric Mason	Auto Body Technology
(Name)	(Unrelated Discipline/Program)
Patrick McGuire	Auto Technology
(Name)	(Unrelated Discipline/Program)

At the option of the self-study team, the validation team may also include one or more of the following: a. someone from a four-year institution in the same discipline; someone from another community college in the same discipline; a high school instructor in the same discipline; a member of an advisory committee for the program. Please complete the following as relevant to your program review.

(Name) (Title)

Affiliation: Telephone Contact Number:

Address
(Mailing) City/State/Zip email address

(Name) (Title)

Affiliation: Telephone Contact Number:

Address
(Mailing) City/State/Zip email address

(Name) (Title)

Affiliation: Telephone Contact Number:

Address
(Mailing) City/State/Zip email address

APPROVED: Margaret Lan 11/17/17
Academic Dean Date

EXECUTIVE SUMMARY
(Validation Team Report)

1. MAJOR FINDINGS

Strengths of the program/discipline:

- Up-to-date drafting lab equipment
  - 32-station CAD lab with up-to-date drafting software AutoCAD and SOLIDWORKS
  - 3-D printer
  - e-printer
- Dedicated cadre of part-time instructors who are connected to the industry.
- Majority of students are under 25; the program is seemingly poised for growth with the Promise Program
- A former ET student, Wyatt Allen was a gold-medal state-wide winner in SkillsUSA (2016) and subsequently placed 5th in national SkillsUSA competition later that year in Kentucky.
- Labor market data indicate adequate demand for the program with good middle skill wages for program graduates
- Related programs at feeder high schools are poised for concurrent enrollment possibilities

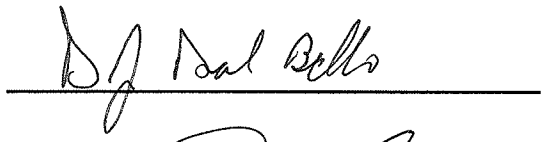
Concerns regarding the program/discipline:

- Program lacks the leadership and support of a full-time instructor
- Insufficient support for program outreach
- Lack of local labor market and occupational guidance regarding TOP code classification
- Lack of active advisory committee
- Lack of sufficient resources (human, facilities, equipment) to fully support civil engineering technology curricula
- The placement of the mechatronics degree/certificate program within Engineering Technology needs to be re-evaluated
- Need to develop realistic two-year completion plans for Engineering Technology degrees and certificates
- Lack of adequate wrap-around student support services (including counseling, tutoring, open access computer lab with support)

2. RECOMMENDATIONS

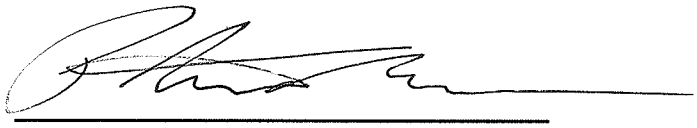
- Partner with selected high schools and industry to provide feedback and direction and develop an action plan for the program
- Develop two-year completion plans for current degrees and certificates
- Identify resources to rebrand and market the program
- Develop an inventory log of equipment and software which includes a maintenance and replacement plan
- Work with Student Services, STEM Center, LRC, etc., to provide student support services
- Partner with selected high schools to offer ET 100 as concurrent enrollment
- Actively recruit a pool of qualified part-time faculty
- Identify resources to work with the Director, K-12 Partnerships, CWE, and Career Development to offer paid internships

VALIDATION TEAM SIGNATURE PAGE



Dom DalBello, Instructor, Engineering

Eric Mason, Instructor, Auto Body Technology



Patrick McGuire, Instructor, Automotive Technology

Margaret Lau, Dean, Academic Affairs

PLAN OF ACTION - POST-VALIDATION
Six Year

DEPARTMENT: Industrial Technology PROGRAM: Engineering Technology

List below as specifically as possible the actions which the department plans to take as a result of this program review. Be sure to address any problem areas which you have discovered in your analysis of the program. Number each element of your plans separately and for each, please include a target date. Additionally, indicate by the number each institutional goal and objective which is addressed by each action plan. (See Institutional Goals and Objectives)

RECOMMENDATIONS TO IMPROVE **STUDENT LEARNING OUTCOMES** AND ACHIEVMENT	**Theme/Objective/ Strategy Number AHC from Strategic Plan**	**Resources Needed**	**Target Date**
Support extra-curricular, learn-by-doing activities such as the annual Skills USA competition, which is a national organization for students in trade, industrial, technical and health occupations education. Such activities provide hands-on CAD drafting and design experience and facilitate team work and collaboration.	Goal SLSI: To ensure continuous improvement based on student learning outcomes assessment data. Goal SLS6: Engage students: Actively involve students in meaningful and authentic educational experiences and activities inside and outside the classroom.	N/A	Fall 2018
Create interdisciplinary opportunities, within the college, that facilitate collaboration with other programs including architecture, welding, and machine technology. The Cal Poly annual Design Village competition is an excellent opportunity for such collaboration on design, construction, and fabrication.	Goal SLS1	N/A	Fall 2018
Collaborate with the library on providing up-to-date resources on engineering drafting, plane surveying, GIS, computer aided drafting (CAD), and print reading & interpretation.	Goal SLS6	Books and References	Fall 20118
Work with Student Services, STEM Center, LRC, etc., to provide student support services	Goal SLS3: Ensure students are directed: Help students clarify their aspirations, develop an educational focus they perceive as meaningful and develop a plan that moves them from enrollment to achievement of their goal	N/A	

RECOMMENDATIONS TO ACCOMMODATE CHANGES IN **STUDENT CHARACTERISTICS**	**Theme/Objective/ Strategy Number AHC from Strategic Plan**	**Resources Needed**	**Target Date**
Enrollment Changes Add more course sections to accommodate the different schedules of a growing student body.	Goal SLS3.	Allocate funds to pay for instructor salaries.	Fall 2019
Demographic Changes Continue outreach efforts to educate students of all ethnic groups about careers in engineering technology, and the higher-than-average earning potential for those with associate degrees. In addition, update program outreach literature/material.	Goal SLS3	Augment print Budget.	Fall 2018
Identify resources to rebrand and market the program	Goal SLS3	Allocate marketing and rebranding funds	Fall 2018

RECOMMENDATIONS TO IMPROVE THE **EDUCATIONAL ENVIRONMENT**	**Theme/Objective/ Strategy Number AHC from Strategic Plan**	**Resources Needed**	**Target Date**
Curricular Changes			
Develop two-year completion plans for current degrees and certificates	Goal SLS3	Stipend	Fall 2018
Ensure CORs are updated to align with the two-year plan of degree/certification completion.	Goal SLS3	Stipend	Fall 2018 Fall 2020 Fall 2022
Create a new "Auto CAD Civil 3D" course to target topics specific to civil engineering drafting technology.	Goal SLS3	Stipend	Fall 2020
Create a new "Plane Surveying" course	Goal SLS3	Stipend	Spring 2020
Create a new Geographic Information Systems (GIS) course.	Goal SLS3	Stipend	Fall 2020
Create a new Highway Plan Reading course to address the transportation component of civil engineering technology.	Goal SLS3	Stipend	Spring 2021
Create a Building Construction Materials Strength Lab.	Goal SLS3	Stipend	Spring 2021
Review and monitor student success indicators (including degree/certificate achievement and revise or develop new curricula as needed.	Goal SLS3	Stipend	Fall 2018 Fall 2020 Fall 2022
Co-Curricular Changes			
Partner with selected high schools and industry to provide feedback and direction and develop an action plan for the program	Goal SLS3	N/A	Fall 2018
Partner with selected high schools to offer ET 100 as concurrent enrollment	Goal SLS3	N/A	Fall 2018
Neighboring College and University Plans			
Work closely with college/ high school counselors on providing students with specific advice regarding transfer, articulation, and engineering technology education and careers.	Goal SLS3	N/A	Fall 2018
Collaborate with Articulation Officer to look for articulation opportunities with other universities offering engineering programs including civil, mechanical, and manufacturing.		N/A	
Collaborate with the transfer center and Institutional Effectiveness on collecting data regarding student transfers to university engineering programs. Data to include acceptances by which university and in what program.		N/A	
Related Community Plans			
Expand the advisory committee to include professionals from civil engineering, industrial engineering, manufacturing, mechanical engineering, and drafting technology. In addition, include committee members with connection to area high schools including instructors. Identify resources to rebrand and market the program	Goal E1: Community Integration: Partner with workforce and industry to expand pursuit of community partnerships and search out opportunities to tell our story to advance the mission of the college.	N/A	Fall 2018
Identify resources to work with the Director, K-12 Partnerships, CWE, and Career Development to offer paid internships	Goal E1: Community Integration:	N/A	Fall 2018
Provide externship and professional development opportunities i.e., conferences, workshops, seminars, in areas such as teacher training, computer aided drafting, land surveying technology, and building information modeling (BIM).	Goal E1	Stipend for externships, professional development funding.	Fall 2018

RECOMMENDATIONS THAT REQUIRE ADDITIONAL RESOURCES	Theme/Objective/ Strategy Number AHC from Strategic Plan	Resources Needed	Target Date
Facilities			
Explore the availability of the second CAD lab O112 as a space to offer additional ET courses.	Goal IR3 To enhance and maintain currency in technology usage/application in support of students and faculty, staff efficiency and operational effectiveness.	N/A	Fall 2019
Equipment			
Purchase (4) "Total Stations" for surveying, general construction layout, construction stake-out, mapping, utility mapping, GIS applications, and environmental studies. Consider "Topcon ES 52 2 Second Reflectorless Total Station 1012174-01" See: https://www.idlandsurvey.com/topcon-es-52-2-second-reflectorless-total-station-1012174-01.html	Goal IR3	$13,200 (Total)	Fall 2018
Purchase (4) Leica GST40 Wooden Tripods. See https://www.idlandsurvey.com/leica-gst40-wooden-tripod.html	Goal IR3	$1,320 (Total)	Fall 2018
Add 4 portable 3D printers to support outreach and marketing. Portable 3D printers such as the XYZprinting da Vinci Jr. 1.0 3D Printer are effective.	Goal IR3	$2,000 (Total)	Fall 2019
Replace existing 32 CAD stations to insure hardware compatibility with the latest software.	Goal IR3	$45,200 (Total)	Fall 2019
Replace existing 30 laptops to insure hardware compatibility with the latest software.	Goal IR3	$30,000	Fall 2021
Develop an inventory log of equipment and software which includes a maintenance and replacement plan	Goal IR3	N/A	Fall 2018
Staffing			
Actively recruit a pool of qualified part-time faculty	Goal IR 1: To recruit and retain quality employees.	Allocate funds to pay for instructor salaries.	Fall 2018

PLAN OF ACTION – Post-Validation

Review and Approval

Plan Prepared By

Saad Sadig _____ Date: 5/4/18

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

Reviewed:

Patrick McGuire, Department Chair, Industrial Technology

_____ Date: 5/4/18

*Signature of Department Chair indicates approval by department of Plan of Action.

Reviewed:

Margaret Lau, Dean of Academic Affairs

Margaret Lau Date: 5/4/2018

Dr. Melinda Nish, Interim Vice President, Academic Affairs

_____ Date: 5-25-18

APPENDICES

COURSE OUTLINES
(ACTIVE)

Note: Course outline is in review. Modified course outline can be found in "Course Outline-In Review" section.

Board Approval: 12/12/2006
PCA Established:
DL Conversion:
Date Reviewed: Spring 2006
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Computer Information Systems or Computer Science (Masters Required) or Engineering Technology (Masters Required)

Department: Industrial Technology

Prefix and Number: ET 100

Catalog Course Title: Computer Aided Drafting and Design

Banner Course Title: Computer Aided Drafting

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	3.000	48.0 - 54.0	1.0
Total Hours	5.0	80.0 - 90.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Pass/No Pass

Requisites

None

Entrance Skills

None

Catalog Description

An introduction to computer-aided drafting and design (CADD) which covers operation of a computer graphics terminal (specifically AutoCAD) to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings.

Course Content

Lecture

1. Introduction to CADD
2. System-Hardware Description and Operation
3. System Operating Modes

4. Drawing File Structure including Storing and Loading Files
5. CADD Software
6. Creating Drawings
7. Command Entry Methods
8. Creation and Manipulation of Drawing Data
9. Modifying the Geometry and the Drawing
10. Text
11. Dimensioning
12. Plotting
13. Creating a Parts Library; Symbols, and Macros
14. CADD/CAM Links

Course Objectives

At the end of the course, the student will be able to:

1. explain the function of the three major components of a CADD system processor (processing section, memory section, and data transfer).
2. perform keying, cursor control, and digitizing tasks on a CADD system.
3. use input commands for accomplishing drafting tasks on a CADD system.
4. perform various manipulation commands on a CADD system.
5. secure a hardcopy of data that appears on a graphics display.
6. set up a plotter, load the media, and give the plot commands to produce a hardcopy.

Methods of Instruction

- **Methods of Instruction Description:**
  TBD

Outside Assignments

- **Other Assignments**
  A variety of computer-aided drafting assignments are required of each student to complete the requirements of ET 100. Each lab project requires the use of a new CADD principle (and a CADD workstation) and mastery of the material can be demonstrated by the quantity and quality of the work completed.

Methods of Evaluation

The student's grade will be determined by the quality of work performed on assigned drawings, completing a minimum number of clock hours using the CADD system, unit tests, and the final exam. The vast majority of test questions require students to demonstrate their understanding of the subject by writing short statements or a paragraph or two.
Sample Test Questions:
1. Given the dimensioned drawing, reproduce the drawing using AutoCAD.
2. If grid accuracy is insufficient, describe another method which provides maximum system accuracy.

3. Explain the difference between mirroring and rotate.
4. What is solid modeling, and why is it important?

Adopted Texts and Other Instructional Materials

Textbooks

1. Richard, Paul F. and Fitzgerald, Jim *Introduction to AutoCAD 2006: A Modern Perspective, 200x* 0 -

Other Texts

1. 1.128 k (min) flash drive
2. Shumaker, T. and Madsen, D. AutoCAD and Its Applications Basics. 2006
3. Shumaker, T. and Madsen, D. AutoCAD and Its Applications Advanced. 2006

Instructional Materials

None

Student Learning Outcomes

1. ET100 SLO1 - explain the function of the three major components of a CADD system processor (processing section, memory section, and data transfer).
2. ET100 SLO2 - perform keying, cursor control, and digitizing tasks on a CADD system
3. ET100 SLO3 - use input commands for accomplishing drafting tasks on a CADD system.
4. ET100 SLO4 - perform various manipulation commands on a CADD system.
5. ET100 SLO5 - secure a hardcopy of data that appears on a graphics display.
6. ET100 SLO6 - set up a plotter, load the media, and give the plot commands to produce a hardcopy.

Distance Learning

This course is not Distance Learning.

Generated on: 1/29/2018 1:14:12 PM

Board Approval: 05/16/2006
PCA Established: 05/16/2006
DL Conversion:
Date Reviewed: Fall 2017
Catalog Year: 2018/2019

Allan Hancock College
Course Outline

Discpline Placement: Electronics
Department: Industrial Technology
Prefix and Number: ET 104
Catalog Course Title: Introduction to Robotics and Mechatronics
Banner Course Title: Intro to Robotics & Mechatroni

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	3.000	48.0 - 54.0	1.0
Total Hours	5.0	80.0 - 90.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade Only

Requisites

None

Entrance Skills

None

Catalog Description

An introduction to robotic control applications. Basic electronics including digital, analog, and microcontroller devices, sensors and transducers, and actuators will be emphasized for automation control. Topics include Basic, Assembly and C language programming for robotic control; interfacing of indicators, switches, sensors and transducers; controlling motion and motors; monitoring and measurement of rotation; measuring light, temperature and conductance; application of navigation and measurement techniques; remote control applications; mechanical systems; and the control of frequency and sound. This course is not open to students who are enrolled in or have received credit for CEL 104 or EL 104.

Course Content

Lecture

1. Introduction to the BASIC Stamp2 and 68HC11 Microcontollers
2. Introduction to PBasic, Assembly, and C language Programming
3. Basic Electronics for interfacing analog and digital devices with signal conditioning

4. Introductory elements to Motors and Controls
5. Introductory elements for Applied Sensors
6. Introductory elements of Industrial Controls
7. Introductory Remote Control applications for automation and robotics

Course Objectives

At the end of the course, the student will be able to:

1. explain the concept and characteristics of a signal source.
2. select and configure proper circuits to achieve desired interfacing requirements between a signal source and a downstream device such as a microcontroller or data acquisition system.
3. explain the practical limitations of operational amplifiers and estimate the effects of these limitations on output voltage and current of the op-amp.
4. design and analyze the performance of RC low-pass and high-pass filter circuits.
5. explain the basic operation of bipolar and MOS field-effect transistors and design with them to activate solenoids, relays, motors, etc. from signal sources.
6. explain the input/output characteristics of digital logic devices and design a logic circuit that accomplishes a given task.
7. explain the underlying operational principles of servo motors.
8. determine the torque and speed requirements for a given motion control application considering system inertia, external forces or torques, and motion profiles and select an appropriate motor.
9. explain the basic structure of the BASIC Stamp2 and 68HC11 microcontrollers.
10. write PBASIC, Assembly, and C language programs to successfully perform digital input and output functions from a microcontroller port.
11. explain the common analog-to-digital-conversion (A/D) methods.
12. develop a program to successfully perform A/D conversion using the BASIC Stamp2 and 68HC11 microcontrollers.
13. explain the digital-to-analog (DAC) conversion process.
14. write programs to successfully interface analog and digital devices, such as sensors and actuators, to the BASIC Stamp2 and 68HC11 microcontrollers.
15. function effectively, as a team member, in carrying out laboratory assignments and open-ended project.
16. document, in written form, laboratory experiments and projects clearly and completely.

Methods of Instruction

- **Demonstration**
- **Lab**
- **Lecture**

Outside Assignments

- **Other Assignments**
  Cooperative learning group projects; presentations; short papers; research; and the following:
  1. readings from adopted text and instructor handouts; evaluate sample problems and work end of chapter problems.
  2. use computer applications to expand upon circuit analysis and comprehension.
  3. use the Internet, as an information resource, to support topics studied in this course.
  4. online practice quizzes and take-home exams covering assigned and related topics.
  5. design projects assigned stressing application of learned concepts and theories.
- **Sample Assignment(s)**

  1. Explain the principle of electromagnetic induction.
  2. Compile a list of different types of electric motors found in household devices and automobiles. Describe the reasons why you think the particular type of motor is used for each example listed.
  3. Explain how to use a FOR...NEXT loop with an ON...GOSUB command to cycle through a list of subroutines.
  3. When should you test subsystems individually before trying to make them work as a system? Why?

Methods of Evaluation

- **Exams/Tests**
- **Quizzes**
- **Papers**
- **Projects**
- **Group Projects**
- **Lab Activities**
- **Other**

1. Comprehensive written examinations for each major study area. Exams will include problem solving techniques and word type problems. The exams will be graded for accuracy and techniques used for problem solutions.
2. End of chapter problems are assigned as homework and graded for accuracy.
3. Design group projects, presentations, and short papers are assigned and graded for quality of research, techniques applied and presented, and for proper engineering practices.
4. Comprehensive final exam. Exam graded for accuracy and applied techniques.
5. Laboratory reports are graded for accuracy and content. Reports consist of:

a. text study information
b. mathematical evaluations of each experimental circuit studied
c. component diagrams for each circuit
d. design problem solutions
e. procedures and data collection
f. end of experiment questions and conclusion

Sample essay questions:
1. For the field of electronics, explain the interrelationships of the following circuit parameters: charge, potential difference, current, resistance, and power.
2. Explain how you access a particular element in a variable array?
3. Explain what you can do to increase or decrease the current passing through a transistor and power MOSFET devices.hy?

Adopted Texts and Other Instructional Materials

Textbooks

1. Gilliland *The Microcontroller Applications Cookbook* Edition: Vol. 2 -

Other Texts

1. D. Alciatore. Introduction to Mechatronics and Measurement Systems. 4th ed. McGraw Hill. 2011
2. W. Bolton. Mechatronics Electronic Control Systems in Mechanical and Electrical Engineering, 6th ed. Prentice Hall. 2016
3. J. Rehg. Industrial Electronics. Prentice Hall. 2006
4. P. Spasov. Microcontroller Technology The 68HC11 and 68HC12, 2004, Prentice Hall
5. C. Kuhnel, Basic Stamp. 2nd ed. Newnes. 2000
6. E. Wise. Applied Robotics II. Prompt. 2002
7. S. Yalamanchili. VHDL A Starter's Guide. 2nd ed. Prentice Hall. 2005

Instructional Materials

1. User's manuals for software tools.
2. Manufacturer's reference and data manuals.
3. Learning management system website for tutorials and supplements
4. Microcontroller Development Boards (supplied by instructor)
5. Programmable Logic Device Prototyping Boards (Xilinx and Altera)
6. Software Design Tools (supplied by instructor)
7. Scientific Calculator
8. Graph paper and normal school supplies
9. Instructor handouts
10. Data Storage Device (Thumb Drive)

Student Learning Outcomes

1. ET104 SLO1 - Demonstrate an understanding of fundamental robotic and mechatronic characteristics, systems, and concepts.
2. ET104 SLO2 - Apply basic mathematical, scientific, electronic, and engineering concepts to design and evaluate mechatronic systems.
3. ET104 SLO3 - Produce programs to perform mechatronic functions for automated control of systems.
4. ET104 SLO4 - Work effectively, individually, and as a member of a group in performing laboratory assignments.

Distance Learning

This course is not Distance Learning.

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Board Approval:
PCA Established:
DL Conversion:
Date Reviewed: Spring 2014
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Auto Body Technology or Automotive Technology or Engineering Technology (Masters Required) or Machine Tool Technology

Department: Industrial Technology

Prefix and Number: ET 117

Catalog Course Title: Print Reading and Interpretation

Banner Course Title: Print Reading & Interpretation

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	3.000	48.0 - 54.0	3.0
Lab	0.000	0.0 - 0.0	0.0
Total Hours	3.0	48.0 - 54.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade or Pass/No Pass

Requisites

None

Entrance Skills

None

Catalog Description

Prepares students to read engineering drawings and specifications and to enable them to understand the intent of the engineer by interpreting the relationship of two-dimensional drawings with respect to actual objects or projects. This course is not open to students who are enrolled in or have received credit for, AB 330, AT 330, ET 330, MT 330, or AT/AB/MT 117.

Course Content

Lecture

1. Introduction to Print Reading, Terminology, CADD, Print features
2. Communicating with a Sketch

3. Scales and Precision Measurement
4. Reading Letters & Lines on a Drawing
5. Reading Multi-View & Auxiliary View Drawings
6. Manufacturing Materials and Processes
7. Reading Dimensions
8. Reading Drawings with Fasteners and Springs
9. Reading Welding Drawings & Weld Symbols
10. Sections, Revolutions, & Breaks
11. Reading Geometric Tolerancing
12. Reading Cam, Gear, & Bearing Drawings
13. Reading Working Drawings

Course Objectives

At the end of the course, the student will be able to:

1. read and interpret various engineering drawings by completing numerous assignments.
2. identify surface finish marks, tolerance, basic architecture, and welding symbols and be able to explain their meanings.
3. use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.
4. use related handbooks, codes, and other references as they may be needed to solve a print reading question.

Methods of Instruction

- **Methods of Instruction Description:**
  Lecture presentations and classroom discussions, drawing handouts followed by lecture/group discussions.

Outside Assignments

- **Outside Assignments**
  Maintain notebook on weekly class topics, weekly homework assignments on class topics.

Methods of Evaluation

Weekly homework assignments, in-class tests on weekly topics, comprehensive final exam graded for accuracy and content.

Adopted Texts and Other Instructional Materials

Textbooks

1. Madsen, David A. *Print Reading for Engineering and Manufacturing Technology* Edition: 3rd 2013

Other Texts
None

Instructional Materials
None

Student Learning Outcomes

1. ET117 SLO1 - read and interpret various engineering drawings by completing numerous assignments.
2. ET117 SLO2 -identify surface finish marks, tolerance, basic architecture, and welding symbols and be able to explain their meanings.
3. ET117 SLO3 - use an engineering drawing accompanying specifications and materials lists to solve industrial questions, to complete a project, or solve a related problem.
4. ET117 SLO4 - use related handbooks, codes, and other references as they may be needed to solve a print reading question.

Distance Learning

This course is not Distance Learning.

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Board Approval: 05/16/2006
PCA Established: 05/16/2006
DL Conversion:
Date Reviewed: Spring 2017
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Electronics
Department: Industrial Technology
Prefix and Number: ET 128
Catalog Course Title: Intro to Renewable Energy
Banner Course Title: Intro to Renewable Energy

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	3.000	48.0 - 54.0	1.0
Total Hours	5.0	80.0 - 90.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade Only

Requisites

Prerequisite
CEL 104 Introduction to Robotics and Mechatronics
or

Prerequisite
EL 104 or
ET 104

Entrance Skills

Upon entering this course, the student should be able to:

CEL 104 - Introduction to Robotics and Mechatronics

- explain the concept and characteristics of a signal source.
- select and configure proper circuits to achieve desired interfacing requirements between a signal source and a downstream device such as a microcontroller or data acquisition system.
- explain the practical limitations of operational amplifiers and estimate the effects of these limitations on output voltage and current of the op-amp.
- design and analyze the performance of RC low-pass and high-pass filter circuits.
- explain the basic operation of bipolar and MOS field-effect transistors and design with them to activate solenoids, relays, motors, etc. from signal sources.
- explain the input/output characteristics of digital logic devices and design a logic circuit that accomplishes a given task.

- explain the underlying operational principles of servo motors.
- determine the torque and speed requirements for a given motion control application considering system inertia, external forces or torques, and motion profiles and select an appropriate motor.
- explain the basic structure of the BASIC Stamp2 and 68HC11 microcontrollers.
- write PBASIC, Assembly, and C language programs to successfully perform digital input and output functions from a microcontroller port.
- explain the common analog-to-digital-conversion (A/D) methods.
- develop a program to successfully perform A/D conversion using the BASIC Stamp2 and 68HC11 microcontrollers.
- explain the digital-to-analog (DAC) conversion process.
- write programs to successfully interface analog and digital devices, such as sensors and actuators, to the BASIC Stamp2 and 68HC11 microcontrollers.
- function effectively, as a team member, in carrying out laboratory assignments and open-ended project.
- document, in written form, laboratory experiments and projects clearly and completely.

Entrance Skills Other (Legacy)

1. explain the application of atomic theory to electronics; correctly analyze and solve electronic circuits; express in writing the relationship between electricity and magnetism.
2. describe in writing the construction, operation, and purpose of resistors, potentiometers, switches, fuses, capacitors, inductors and batteries.
3. identify the average, effective, peak, and peak-to-peak values of AC waveforms; predict the frequency and period of AC waveforms.
4. identify defects in DC and AC circuits; interpret circuit parameters, diagnose and correct malfunctions in electronic circuits.
5. design DC and AC circuits using standard engineering practices; develop graphs indicating relationships of electronic parameters.
6. evaluate the operation and circuit parameters for all experimental circuits.
7. interface electromechanical systems to microcontrollers.
8. use commonly used electronic test and measurement instrumentation and develop Assembly and PBASIC computer language programs for automation control.

Catalog Description

A study of the principles behind energy generation and conversion that can be applied to modern electrical, mechanical, and chemical devices that use or produce power. Special emphasis will be given to the study of electricity as a renewable energy source. This course is not open to students who are enrolled in or have received credit for EL 128 or CEL 128.

Course Content

Lecture

1. Solar Thermal Energy
2. Solar Photovoltaics
3. Wind Energy
4. Hydroelectricity
5. Geothermal Energy
6. Bioenergy
7. Integration and Control

Course Objectives

At the end of the course, the student will be able to:

1. design programmable charger systems for rechargeable batteries.
2. describe the operation of photovoltaic cells.
3. design power generation systems using solar cells.
4. fabricate servo-driven sun tracking capabilities to maximize power output of energy system.
5. describe the operation of AC alternators.
6. design power generation systems using wind-driven AC alternators.
7. determine the generation of three-phase power using both Delta or Wye configurations.
8. convert AC into DC using two basic forms of rectification, half-wave and full-wave.
9. design, build and program half- and full-wave rectification systems.
10. compare single-phase and three-phase power generation and applications to real-world devices.
11. design and program microcontroller systems to collect, log, plot, and analyze data from energy generation sources.
12. program microcontroller systems for control of energy generation sources.

Methods of Instruction

- **Lab**
- **Lecture**

Outside Assignments

- **Outside Assignments**
  Cooperative learning group projects; presentations; short papers; research; and the following:
  1. Readings from adopted text and instructor handouts; evaluate sample problems and work end of chapter problems.
  2. Use computer applications to expand upon circuit analysis and comprehension.
  3. Use the Internet, as an information resource, to support topics studied in this course.
  4. Online practice quizzes and take-home exams covering assigned and related topics.
  5. Design projects assigned stressing application of learned concepts and theories.
- **Sample Assignment(s)**
  Using the following diagram, explain the operation of the photovoltaic reaction for the charging of battery storage devices.

Methods of Evaluation

1. Comprehensive written examinations for each major study area. Exams will include problem solving techniques and word type problems. The exams will be graded for accuracy and techniques used for problem solutions.
2. End of chapter problems are assigned as homework and graded for accuracy.
3. Individual and group design projects, presentations, and short papers are assigned and graded for quality of research, style and techniques applied and presented, and for proper engineering practices.
4. Comprehensive final exam. Exam graded for accuracy and applied techniques.
5. Laboratory reports are graded for accuracy and content. Reports consist of:
a. text study information.
b. mathematical evaluations of each experimental circuit studied.
c. component diagrams for each circuit.
d. design problem solutions.
e. procedures and data collection.
f. end of experiment questions and conclusions.

Adopted Texts and Other Instructional Materials

Textbooks

1. Chiras *The Homeowner's Guide to Renewable Energy* 2011 -

Other Texts

1. Software Tools (supplied by instructor and textbook bundle)
2. Microcontroller Development System (supplied by instructor)
3. Instructor handouts
4. B. Sorensen. Renewable Energy. 3rd ed. Academic Press. 2004
5. G. Masters. Renewable and Efficient Electric Power Systems. Wiley-IEEE Press. 2004

Instructional Materials

1. Scientific calculator
2. Graph paper/school supplies
3. Data storage device (USB)

Student Learning Outcomes

1. ET128 SLO1 - Demonstrate an understanding of fundamental alternative energy concepts that pertain to the generation of electricity.
2. ET128 SLO2 - Apply basic mathematical, scientific, electronic, and engineering concepts to design and fabricate alternative energy systems.
3. ET128 SLO3 - Demonstrate knowledge of technology applicable to the field alternative energy systems, and show a proficiency in appropriate software used in system design.

Distance Learning

This course is not Distance Learning.

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Board Approval: 05/16/2006
PCA Established: 05/16/2006
DL Conversion:
Date Reviewed: Fall 2017
Catalog Year: 2018/2019

Allan Hancock College
Course Outline

Discpline Placement: Electronics -1
Department: Industrial Technology
Prefix and Number: ET 131
Catalog Course Title: Programmable Logic Controllers and Industrial Control Design
Banner Course Title: PLCs and Industrial Control De

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	3.000	48.0 - 54.0	1.0
Total Hours	5.0	80.0 - 90.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade Only

Requisites

Prerequisite
EL 125 Digital Devices and Circuits

Entrance Skills

Upon entering this course, the student should be able to:

EL 125 - Digital Devices and Circuits

- model digital circuits using Boolean algebra.
- derive an equivalent logic circuit from a Boolean expression.
- design and analyze counters, registers, and dividers using bi-stable devices.
- properly interface logic families that have different operational parameters.
- design logic systems for a stated problem using standard engineering practices.
- analyze logic systems to determine their operating parameters.

Entrance Skills Other (Legacy)

1. evaluate and draw a block diagram of a computer system, label each major component and register, and sequentially follow the flow of data through the various registers as a sample program is executed.

2. convert a number given in any base to an equivalent number in another base with an emphasis on binary, octal, decimal, and hexadecimal number systems.
3. synthesize the operation and uses of state of the art digital devices such as multiplexers, ALU's, Programmable Logic Arrays.
4. design and analyze counters, registers, and dividers using bi-stable devices.
5. properly interface logic families that have different operational parameters.
6. design logic circuits and networks to solve assigned projects using standard engineering practices.

Catalog Description

A study of the purpose and operating features of a programmable logic controller (PLC). Topics include PLC terminology, architecture, input/output modules, memory, commands for internal relays, on/off timers, up/down counters, use of subroutines, program control, and math instructions. Relay schematics, ladder logic diagrams, and programming of logic controllers are emphasized. Sensing devices and time-driven process sequences will be studied and integrated into control systems. This course is not open to students who are enrolled in or have received credit for CEL 131 or EL 131.

Course Content

Lecture

1. PLC Principles of Operation
2. PLC Hardware Components
3. Review of Number Systems, Codes, and Fundamentals of Logic
4. PLC Programming, RSLogic Familiarization
5. PLC Wiring Diagrams and Ladder Logic Programs
6. Programming Timers and Counters
7. Program Control Instructions
8. Math, Sequencer, and Shift Register Instructions
9. PLC Installation Practices, Editing and Troubleshooting
10. Process Control and Data Acquisition Systems
11. Computer-Controlled Machines and Process
12. Projects: Traffic Light Control Scenario, Elevator Control Scenario, Amusement Ride Scenario, and Power Management System Scenario

Course Objectives

At the end of the course, the student will be able to:

1. define what a PLC is and list its advantages over relay systems.
2. identify the main parts of a PLC and describe their function.
3. outline the basic sequence of operation for a PLC
4. describe the basic circuitry and applications for discrete and analog I/O and CPU specifications.
5. explain I/O addressing
6. explain the BCD, Gray, and ASCII code systems, and perform math operations with binary numbers.
7. construct circuits from Boolean expressions and derive Boolean equations from given logic circuits.
8. convert relay ladder schematics to ladder logic programs.
9. develop elementary programs based on logic gate functions.
10. program instructions that perform logical operations.
11. explain the operation of sensors commonly found in PLC installations.
12. explain the operation of output control devices commonly found in PLC installations.
13. compare sequential and combination control processes.
14. write PLC programs directly from a narrative description
15. describe the operation of pneumatic on-delay and off-delay timers.
16. convert fundamental timer relay schematic diagrams to PLC ladder logic programs.

17. analyze and interpret typical PLC timer ladder logic programs.
18. list and describe the functions of PLC counter instructions.
19. describe the operation principle of a transitional, or one-shot, contact.
20. apply the PLC counter function and associated circuitry to control systems.
21. state the purpose of program control instructions.
22. explain the functions of subroutines.
23. describe safety considerations built into PLCs and programmed into a PLC installation.
24. explain how the temporary end instruction can be used to troubleshoot a program.
25. describe the basic operation of a closed-loop control system.
26. interpret data transfer and data compare instructions as they apply to a PLC program.
27. apply combinations of PLC arithmetic functions to processes.
28. compare the operation of an event-driven and a time-driven sequencer.
29. interpret and develop programs that use shift registers.
30. list and describe specific PLC troubleshooting procedures.
31. identify and describe the functions of bleeder resistors in PLCs.
32. compare individual, centralized, and distributive control systems.
33. outline the function of the different parts of a data acquisition system.

Methods of Instruction

- **Lab**
- **Lecture**

Outside Assignments

- **Outside Assignments**
  Cooperative learning group projects; presentations; short papers; research; and the following:
  1. readings from adopted text, CAI software, and instructor handouts; evaluate sample problems, work end of chapter problems and lab exercises.
  2. use computer applications to expand upon circuit analysis and comprehension.
  3. use the Internet, as an information resource, to support topics studied in this course.
  4. online practice quizzes and take-home exams covering assigned and related topics.
  5. design projects assigned stressing application of learned concepts and theories.

- **Sample Assignment(s)**
  Sample writing assignment:
  Prepare a user's and maintenance pamphlet that explains the operation and the logic you designed for one of the four-class projects: Traffic Light Scenario, Elevator Control Scenario, Amusement Ride Scenario, or the Power Management System Scenario.

Methods of Evaluation

- **Exams/Tests**
- **Projects**
- **Group Projects**
- **Home Work**
- **Lab Activities**
- **Other**
  1. Comprehensive written examinations for each major study area. Exams will include problem solving techniques and word type problems. The exams will be graded for accuracy and techniques used for problem solutions.
  2. End of chapter problems are assigned as homework and graded for accuracy.
  3. Individual and group design projects, presentations, and short papers are assigned and graded for quality of research, style and techniques applied and presented, and for proper engineering practices.
  4. Comprehensive final exam. Exam graded for accuracy and applied techniques.
  5. Laboratory reports are graded for accuracy and content. Reports consist of:
  a. text study information.
  b. mathematical evaluations of each experimental circuit studied.
  c. component diagrams for each circuit.
  d. design problem solutions.
  e. procedures and data collection.

f. end of experiment questions and conclusions.

Sample essay questions:
1. Compare and contrast the operation of the final control element in on/off and proportional control systems.
2. Compare the ways a timer is addressed in the Allen-Bradley PLC-5 and SLC-500 controllers with the methods used in a ControlLogix controller.

Adopted Texts and Other Instructional Materials

Textbooks

1. Petruzella *Lab Manual for Programmable Logic Controllers with Logixpro PLC Simulator* Edition: 5th 2017
2. Petruzella *Activities Manual for Programmable Logic Controllers* Edition: 5th 2017
3. Petruzella *Programmable Logic Controllers* Edition: 5th 2017 -

Other Texts

1. Software Tools (supplied by instructor and textbook bundle)
2. Instructor handouts
3. NIDA. Homework CD 2. NIDA Corp. 2006.
4. J. Stenerson. Programming PLCs Using Rockwell Automation Controllers. Prentice Hall. 2004
5. M. Rabiee. Programmable Logic Controllers Hardware and Programming. Goodheart-Willcox. 2002.
6. J. Rehg. Industrial Electronics. Prentice-Hall. 2006

Instructional Materials

1. Scientific calculator
2. Graph paper / school supplies
3. Data storage device (flash drive)

Student Learning Outcomes

1. ET131 SLO1 - Demonstrate an understanding of fundamental programmable logic controller concepts that pertains to the areas mechatronics.
2. ET131 SLO2 - Develop and implement software programs for programmable logic devices controlling mechatronic systems.
3. ET131 SLO3 - Design and construct programmable logic controller circuits using mathematical models.

Distance Learning

This course is not Distance Learning.

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Board Approval: 05/16/2006
PCA Established: 05/16/2006
DL Conversion:
Date Reviewed: Fall 2017
Catalog Year: 2018/2019

Allan Hancock College
Course Outline

Discpline Placement: Electronics
Department: Industrial Technology
Prefix and Number: ET 133
Catalog Course Title: Mechatronic Systems 1
Banner Course Title: Mechatronic Systems 1

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	3.000	48.0 - 54.0	1.0
Total Hours	5.0	80.0 - 90.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade Only

Requisites

Prerequisite
CEL 104 Introduction to Robotics and Mechatronics
or EL 104 or ET 104

Entrance Skills

Upon entering this course, the student should be able to:

CEL 104 - Introduction to Robotics and Mechatronics

- explain the concept and characteristics of a signal source.
- select and configure proper circuits to achieve desired interfacing requirements between a signal source and a downstream device such as a microcontroller or data acquisition system.
- explain the practical limitations of operational amplifiers and estimate the effects of these limitations on output voltage and current of the op-amp.
- design and analyze the performance of RC low-pass and high-pass filter circuits.
- explain the basic operation of bipolar and MOS field-effect transistors and design with them to activate solenoids, relays, motors, etc. from signal sources.
- explain the input/output characteristics of digital logic devices and design a logic circuit that accomplishes a given task.
- explain the underlying operational principles of servo motors.
- determine the torque and speed requirements for a given motion control application considering system inertia, external forces or torques, and motion profiles and select an appropriate motor.
- explain the basic structure of the BASIC Stamp2 and 68HC11 microcontrollers.

- write PBASIC, Assembly, and C language programs to successfully perform digital input and output functions from a microcontroller port.
- explain the common analog-to-digital-conversion (A/D) methods.
- develop a program to successfully perform A/D conversion using the BASIC Stamp2 and 68HC11 microcontrollers.
- explain the digital-to-analog (DAC) conversion process.
- write programs to successfully interface analog and digital devices, such as sensors and actuators, to the BASIC Stamp2 and 68HC11 microcontrollers.
- function effectively, as a team member, in carrying out laboratory assignments and open-ended project.
- document, in written form, laboratory experiments and projects clearly and completely.

Entrance Skills Other (Legacy)

1. select and configure proper circuits to achieve desired interfacing requirements between a signal source and a downstream device such as a microcontroller or data acquisition system.
2. explain the input/output characteristics of digital logic devices and design a logic circuit that accomplishes a given task.
3. explain the underlying operational principles of servo motors.
4. explain the basic structure of the BASIC Stamp2 and 68HC11 microcontrollers.
5. write PBASIC, Assembly, and C language programs to successfully perform digital input and output functions from a microcontroller port.
6. write programs to successfully interface analog and digital devices, such as sensors and actuators, to the BASIC Stamp2 and 68HC11 microcontrollers.

Catalog Description

This is a hands-on mechatronic systems course that focuses on the electro-mechanical concepts (mechanics, electronic, and programming) of automated systems. Emphasis is placed on how industrial grade sensors and transducers function and upon how they are interfaced into control systems. Study topics include: transducers and sensors for light, heat, motion, pressure, and position control; switching devices; input and output signal conditioning; continuous, closed-loop, and proportional integral derivative process control; and safety. This course is not open to students who have received credit for or are enrolled in CEL 133 or EL 133.

Course Content

Lecture

1. Discrete control input and output devices
2. Introduction to Solid-State Devices in Industrial Applications, Operational Amplifiers, and Linear ICs
3. SCR, TRIACs, and other Thyristors
4. Discrete Automation Sensors and Devices including Vision Systems
5. Analog Process Control Devices and Sensors: Heat, Pressure, Flow, Level, and Position
6. Control of Continuous Processes
7. Data Communication between Intelligent Machines
8. Safety

Course Objectives

At the end of the course, the student will be able to:

1. identify, describe, and make an application selection for mechanically activated limit switches and process switches.

2. identify, describe, and make an application selection for the following control output devices: solenoids, commercial relays, industrial control and time delay relays, contactors, process solenoid valves, pneumatic direction control valves, heaters, and pilot lamps.
3. describe the operation of the low-pass, high-pass, bandpass, and band-elimination active filters.
4. describe the structure and operation of SCRs, tracs, and other members of the thyristor family.
5. select the appropriate noncontact sensor given the parameters for a sensing application and integrate the sensor using good design practices.
6. match the output of a sensor to the input of the controller using current-sourcing and current-sinking techniques.
7. select the appropriate type of vision and illumination system given the parameters for a sensing application.
8. analyze the characteristics of devices that convert electricity into light and light into electricity.
9. determine the range, linearity, and sensitivity of various thermal transducers.
10. analyze dynamic temperature transducer amplifiers.
11. identify the principles of motion and compass transducers.
12. compute linear and circular motion rates based on a system's mechanical and electrical parameters.
13. analyze the operation of optical-motion-to-frequency and motion-to-analog-DC-voltage transducer circuits for RPM, velocity, acceleration, and deceleration.
14. identify the principles of position-sensing circuits.
15. compute linear and rotary position based on electrical and mechanical circuit parameters.
16. develop a safety strategy, including risk assessment, risk elimination, and hazard minimization.
17. identify the principles of A/D and D/A conversion.
18. analyze the operation of PAM, PWM, PPM, modulation and demodulation circuits.
19. list the general closed-loop control modes and explain how each acts to correct the system error.

Methods of Instruction

- **Lab**
- **Lecture**

Outside Assignments

- **Outside Assignments**
  Cooperative learning group projects; presentations; short papers; research; and the following:
  1. Readings from adopted text, CAI software, and instructor handouts; evaluate sample problems, work end of chapter problems and lab exercises.
  2. Use computer applications to expand upon circuit analysis and comprehension.
  3. Use the Internet, as an information resource, to support topics studied in this course.
  4. Online practice quizzes and take-home exams covering assigned and related topics.
  5. Design projects assigned stressing application of learned concepts and theories.
- **Sample Assignment(s)**
  Describe how current-sourcing and current-sinking outputs operate. Why is current sinking associated with NPN transistors and current sourcing with PNP?

Methods of Evaluation

- **Exams/Tests**
- **Quizzes**
- **Projects**
- **Home Work**
- **Lab Activities**
- **Other**
  1. Comprehensive written examinations for each major study area. Exams will include problem solving techniques and word type problems. The exams will be graded for accuracy and techniques used for problem solutions.

  2. End of chapter problems are assigned as homework and graded for accuracy.

  3. Individual and group design projects, presentations, and short papers are assigned and graded for quality of research, style and techniques applied and presented, and for proper engineering practices.

4. Comprehensive final exam. Exam graded for accuracy and applied techniques.

5. Laboratory reports are graded for accuracy and content. Reports consist of:
a. Text and CAI study information
b. Mathematical evaluations of each experimental circuit studied
c. Component diagrams for each circuit
d. Design problem solutions
e. Procedures and data collection
f. End of experiment questions and conclusions

Sample Essay Question:
How can you compare the frequency response specification given for inductive sensors with the rise- and fall-time specification given for photoelectric sensors?

Adopted Texts and Other Instructional Materials

Textbooks

1. NIDA Corporation *Model 1405 Transducers, CAI software* 2015
2. Miller, M *Industrial Electricity & Control* 2013

Other Texts

1. Anderson, G. PLC Programming Using RS500: Basic Concepts of Ladder Logic Programming, Vol. 1, 2015.
2. NIDA Corporation Homework Disc 2 Software Tools (supplied by instructor and textbook bundle)
3. Microcontroller Development Boards and Lab Components (supplied by instructor)
4. Instructor handouts
5. Lindsay, What's a Microcontroller?, 2012, Parallax (available online)
6. Lindsay, Robotics with the Boe-Bot, 2012, Parallax (available online)
7. W. Kleitz, Digital Electronics with VHDL, 2011, Prentice Hall
8. M. Gilliland, The Microcontroller Application Cookbook, 2000, Woodglen Press

Instructional Materials

1. Data storage device (USB)
2. Scientific calculator

Student Learning Outcomes

1. ET133 SLO1 - Apply basic mathematical, scientific, electronic, and engineering concepts to evaluate sensing and transducer devices used in mechatronic systems.
2. ET133 SLO2 - Select the appropriate type of transmission medium, sensing and transducer elements in the design of mechatronic systems.
3. ET133 SLO3 - Identify the principles of basic mechatronic concepts.

Distance Learning

This course is not Distance Learning.

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Board Approval: 05/16/2006
PCA Established: 05/16/2006
DL Conversion:
Date Reviewed: Fall 2016
Catalog Year: 2018/2019

Allan Hancock College
Course Outline

Discpline Placement: Electronics
Department: Industrial Technology
Prefix and Number: ET 139
Catalog Course Title: Electrical Power, Motors, and Controls
Banner Course Title: Electrical Power, Motors, & Co

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	3.000	48.0 - 54.0	1.0
Total Hours	5.0	80.0 - 90.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade Only

Requisites

Prerequisite
EL 122 Electronic Devices and Circuits
and

Prerequisite
EL 125 Digital Devices and Circuits

Entrance Skills

Upon entering this course, the student should be able to:

EL 122 - Electronic Devices and Circuits

- describe the electrical characteristics of semiconductor materials.
- explain in writing how semiconductor devices operate.
- differentiate the schematic symbols that are used to represent a wide variety of semiconductor devices.
- interpret device specifications using manufacturer's data sheets.
- analyze transistor amplifier circuits, describe their operation and list the characteristics for each.
- identify and explain the operation of power supply rectifiers, filters, and regulation circuits.
- evaluate the effects of negative and positive feedback on integrated circuits.
- analyze the basic operation of common linear integrated circuit systems

EL 125 - Digital Devices and Circuits

- model digital circuits using Boolean algebra.
- derive an equivalent logic circuit from a Boolean expression.
- design and analyze counters, registers, and dividers using bi-stable devices.
- properly interface logic families that have different operational parameters.
- design logic systems for a stated problem using standard engineering practices.
- analyze logic systems to determine their operating parameters.

Entrance Skills Other (Legacy)

1. understand analog and digital electronics which are the basic elements underlying mechatronic systems.
2. use commonly-used electronic test and measurement instrumentation.
3. analyze project designs using standard breadboarding techniques.
4. identify electronic components and symbols.
5. differentiate the schematic symbols that are used to represent a wide variety of semiconductor, reactive, and passive electronic devices.
6. interpret device specifications using manufactures data sheets.
7. analyze circuits, describe their operation, and list characteristics for each.

Catalog Description

A study of electronics, signal communication and power technology that support efficient manufacturing processes for various industries. Topics include motors, their drives and controls, power electronics, PLCs, and communications networks used to monitor industrial processes. This course is not open to students who are enrolled in or have received credit for CEL 139 or EL 139.

Course Content

Lecture

1. Fundamentals of Energy, the Power System, and Quality Considerations
2. Single and Three-Phase Power
3. Transformers, Magnet materials, and Circuits
4. Introduction to DC Motors and Generators
    a. Stepper Motors
    b. DC Series Motors
    c. Brushless DC Motors
5. Introduction to AC Motors and Generators
    a. Single Phase
    b. Three Phase
6. Pulse Width Modulation and Amplification
7. Open Loop Motor Systems
8. Motion Detection
9. Closed Loop Motor Systems
10. Proportional, Integral, and Derivative Control Systems
11. System maintenance and Troubleshooting
12. Building Electrical Systems

Course Objectives

At the end of the course, the student will be able to:

1. describe speed, torque, counter electromotive force, loads, power and efficiency in rotation machinery.
2. describe the operation of DC motors and generators.
3. measure signals in the control circuits for a DC motor/generator set.
4. troubleshoot a DC motor/generator set.
5. describe the operation and characteristics of stepper motors.
6. measure signal in the control circuits for stepper motors.
7. troubleshoot stepper motors.
8. describe AC motor theory of operation, and construction for single and three phase motors.
9. describe the equivalent model of an induction motor transformer.
10. describe general AC generator theory, construction and characteristics.
11. describe the DC Series Field motor and its characteristics.
12. identify the principles of circular force and torque.
13. identify the loaded characteristics of a DC Series Field motor.
14. identify the physical characteristics of a BLDC, brushless DC motor.
15. describe motor drive, position sensing, and other controller functions.
16. perform routine maintenance, operational, and performance tests on motors.
17. identify the principles of PWM, pulse width modulation.
18. describe the operation of PWM motor control.
19. describe the operation of a PWM Amplifier/Driver.
20. describe an open loop motor system.
21. examine block diagrams of open loop systems.
22. list the terminal characteristics of an armature-controlled motor.
23. measure circuit frequency and calculate RPM.
24. identify the characteristics of motion transducers.
25. compute linear and rotary motion rates based on system mechanical and electrical parameters.
26. analyze motion to frequency for RPM and velocity determinations.
27. analyze motion to analog DC for RPM and velocity determinations.
28. describe a closed loop feedback controlled motor system.
29. measure the error and feedback signals in a closed loop DC motor system.
30. describe the basic process of troubleshooting motor control systems.
31. trace signal flow through a closed loop feedback system
32. troubleshoot and fault isolate to the circuit level of a closed loop feedback system.
33. identify the principles of PID, Proportional, Integral, and Derivative control.
34. adjust the PID proportional gain.
35. adjust the PID integral reset control.
36. adjust the PID derivative rate control

Methods of Instruction

- **Lab**
- **Lecture**

Outside Assignments

- **Other Assignments**
  Cooperative learning group projects; presentations; short papers; research; and the following:
  1. readings from adopted text and instructor handouts; evaluate sample problems and work end of chapter problems.
  2. use computer applications to expand upon circuit analysis and comprehension.
  3. use the Internet, as an information resource, to support topics studied in this course.
  4. online practice quizzes and take-home exams covering assigned and related topics.
  5. design projects assigned stressing application of learned concepts and theories.
- **Sample Assignment(s)**

  1. Explain how the direction of rotation of a three-phase induction motor can be reversed.
  2. What are the advantages of wound-rotor induction motors?

Methods of Evaluation

- **Exams/Tests**
- **Quizzes**

- **Papers**
- **Projects**
- **Group Projects**
- **Lab Activities**
- **Other**

1. Comprehensive written examinations for each major study area. Exams will include problem solving techniques and word type problems. The exams will be graded for accuracy and techniques used for problem solutions.
2. End of chapter problems are assigned as homework and graded for accuracy.
3. Individual and group design projects, presentations, and short papers are assigned and graded for quality of research, style and techniques applied and presented, and for proper engineering practices.
4. Comprehensive final exam. Exam graded for accuracy and applied techniques.
5. Laboratory reports are graded for accuracy and content. Reports consist of:

a. text study information.
b. mathematical evaluations of each experimental circuit studied.
c. component diagrams for each circuit.
d. design problem solutions.
e. procedures and data collection.
f. end of experiment questions and conclusions.

Sample essay Questions:
1. Why is power-factor correction important for industries?
2. Evaluate and explain the relationships of rotor current and stator current in a three-phase synchronous motor at unity power factor.

Adopted Texts and Other Instructional Materials

Textbooks

1. NIDA Corp *Motors and Motor Control Systems (online)* 2015 -

Other Texts

1. Course management system for for tutorials and supplements.
2. NIDA Corporation Homework sets 2 and 3
3. Software Tools (supplied by instructor and textbook bundle)
4. Instructor handouts
5. G. Rockis. Electrical Motor Controls for Integrated Systems. Industrial Text Co. 2013

Instructional Materials

1. Scientific calculator
2. Graph paper / school supplies
3. Data storage device

Student Learning Outcomes

1. ET139 SLO1 - Demonstrate an understanding of fundamental motor and generator concepts that pertain to electromechanical systems.
2. ET139 SLO2 - Apply basic mathematical, scientific, electronic, and engineering concepts to evaluate motors and generators used in mechatronic systems.
3. ET139 SLO3 - Troubleshoot motors, generators, and control circuits used in mechatronic systems.

Distance Learning

This course is not Distance Learning.

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Note: Course outline is in review. Modified course outline can be found in "Course Outline-In Review" section.

Board Approval:
PCA Established:
DL Conversion:
Date Reviewed: Fall 2006
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Engineering Technology (Masters Required)
Department: Industrial Technology
Prefix and Number: ET 140
Catalog Course Title: Engineering Drawing
Banner Course Title: Engineering Drawing

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	4.000	64.0 - 72.0	1.0
Total Hours	6.0	96.0 - 108.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Pass/No Pass

Requisites

Prerequisite
ET 100 Computer Aided Drafting and Design

Entrance Skills

Upon entering this course, the student should be able to:

ET 100 - Computer Aided Drafting and Design

- explain the function of the three major components of a CADD system processor (processing section, memory section, and data transfer).
- perform keying, cursor control, and digitizing tasks on a CADD system.
- use input commands for accomplishing drafting tasks on a CADD system.
- perform various manipulation commands on a CADD system.
- secure a hardcopy of data that appears on a graphics display.
- set up a plotter, load the media, and give the plot commands to produce a hardcopy.

Entrance Skills Other (Legacy)

1. explain the function of the three major components of a CADD system processor (processing section, memory section, and data transfer).

2. perform keying, cursor control, and digitizing tasks on a CADD system.
3. use input commands for accomplishing drafting tasks on a CADD system.
4. perform various manipulation commands on a CADD system.
5. secure a hardcopy of data that appears on a graphics display.
6. set up a plotter, load the media, and give the plot commands to produce a hardcopy.

Catalog Description

The principles and application of engineering drawing, including orthographic projections, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners are the core of this course. A computer aided drafting system (CAD) will be used extensively by the student to complete the requirements of this course.

Course Content

Lecture

1. Orthographic Projection
2. Freehand Sketching
3. Pictorial Drawings
4. Lettering
5. Dimensioning
6. Sectioning
7. Auxiliary Views
8. Surface finish
9. Standard Tolerancing
    a. fit between mating parts
    b. specification of tolerances
    c. American National Standards
    d. accumulation of Tolerances
10. Geometric Tolerancing
11. Threads and Fasteners

Course Objectives

At the end of the course, the student will be able to:

1. use freehand sketching to convey a technical idea or concept.

2. use a CADD system to develop and produce working drawings to current industrial standards.
3. use a CADD system to: A. create, store, and retrieve "parts" from a CADD library. B. construct a working drawing using multiviews, pictorials, sections, and auxiliary views. C. dimension and tolerance working drawings to current industrial standards. D. place geometric tolerances and symbols to engineering drawings.

Methods of Instruction

- **Lab**
- **Lecture**

Outside Assignments

- **Other Assignments**
  A variety of drafting projects are assigned each student. These projects are selected in a manner to fulfill the goals and objectives of the course. The drawings require design considerations, current methodology used in an engineering drawing, ANSI Y I4.5M Standards, tolerancing, and the assembly of closely fitted parts.

Methods of Evaluation

Each student will prepare a portfolio of their work and maintain a drafting log. The majority of the semester grade is based on the quality/quantity of the work (presented in the portfolio) and progress made during the semester. The remaining portion of the grade will be comprised of quizzes, tests and the final exam.

Sample Test Question:
Give the proper ANSI Y14.5M symbol for the following: at maximum material condition, regardless of feature size, reference dimension, counterbore/spotface, and spherical radius.

Adopted Texts and Other Instructional Materials

Textbooks

1. Goetsch, Chalk, Nelson *Technical Drawing* Edition: 4th 2000 -
2. Madsen *Geometric Dimensioning and Tolerancing* 2003 -

Other Texts

1. ANSI Standards: Dimensioning and Tolerancing. (YI4.5). 1994. Screw Threads. (Y14.6). I989. Surface Texture Symbols. (Y14.36). I996.
2. USB Flash drive
3. Log Book
4. 8-1/2 x 11 graph paper
5. Oberg, Johns, and Horton. Machinery's Handbook. 20th ed or newer edition. Industrial Press.

Instructional Materials
None

Student Learning Outcomes

1. ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.
2. ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.
3. ET140 SLO3 – Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.

4. ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.
5. ET140 SLO5 - Develop the understanding of geometric dimensioning and tolerancing. Understand symbols and application.
6. ET140 SLO6 - Be able to create an assembly drawing project to completion. To include creation of a bill of material.
7. ET140 SLO7 - Be able to use a 3D CADD program to create simple 3D models.

Distance Learning

This course is not Distance Learning.

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Note: Course outline is in review. Modified course outline can be found in "Course Outline-In Review" section.

Board Approval:
PCA Established:
DL Conversion:
Date Reviewed: Fall 2006
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Engineering Technology (Masters Required)
Department: Industrial Technology
Prefix and Number: ET 145
Catalog Course Title: Advanced Engineering Drawing
Banner Course Title: Advanced Engineering Drawing

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	4.000	64.0 - 72.0	1.0
Total Hours	6.0	96.0 - 108.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Pass/No Pass

Requisites

Prerequisite
ET 140 Engineering Drawing

Entrance Skills

Upon entering this course, the student should be able to:

ET 140 - Engineering Drawing

- use freehand sketching to convey a technical idea or concept.
- use a CADD system to develop and produce working drawings to current industrial standards.
- use a CADD system to: A. create, store, and retrieve "parts" from a CADD library. B. construct a working drawing using multiviews, pictorials, sections, and auxiliary views. C. dimension and tolerance working drawings to current industrial standards. D. place geometric tolerances and symbols to engineering drawings.

Entrance Skills Other (Legacy)

1. use freehand sketching to convey a technical idea or concept.
2. use a CADD system to develop and produce working drawings to current industrial standards.

3. use a CADD system to:

    a. create, store, and retrieve "parts" from a CADD library.

    b. construct a working drawing using multiviews, pictorials, sections, and auxiliary views.

    c. dimension and tolerance working drawings to current industrial standards.

    d. place geometric tolerances and symbols to engineering drawings.

Catalog Description

Use of advanced technical drawing techniques on a CADD system to solve design component problems requiring details and assemblies. The course covers freehand sketching to develop ideas, fabrication and working drawings dimensioned to ANSI standards, including tolerances, title blocks, change orders, symbols and notes. Use of handbooks, ordinances, codes, selection of hardware and materials will be incorporated in each student's individual project.

Course Content

Lecture

1. Freehand Sketching to Develop Preliminary Ideas in Preparation for Work on CADD Terminal.
2. Preparation of Working Drawing of a Complete System or Component; Selection and Use of Standards Hardware, Fabrication and Detail Drawings.
3. Use of CADD System to Develop: Assembly Drawings; Material/Part List.
4. Scale
5. Dimensioning to Current ANSI Standards.
6. Title Blocks, Change Orders, Symbols and Notes.
7. The Use of "Handbooks".
8. Use of Related Codes and Ordinances.
9. Geometric Tolerancing to Fit Two or More Parts.

Course Objectives

At the end of the course, the student will be able to:

1. evaluate and apply related codes, ordinances and regulations to complete working drawings.
2. apply the capabilities of a CADD system to develop and produce advanced working drawings to current industrial standards.
3. plan and outline the necessary information or steps to complete an involved project on a CADD system prior to booting up the system.
4. select and initiate the macro's and files necessary for a CADD system to produce a material or parts list from an assembly drawing.
5. apply geometric tolerancing to an engineering drawing to fit two or more parts.

Methods of Instruction

- **Lab**
- **Lecture**

Outside Assignments

- **Other Assignments**
  Students will be assigned projects which will require them to use advanced technical drawing techniques on a CADD system to complete the requirements of the course. Assignments will require either designing some new or missing components or the revision of old. The student will be required to complete a major project which will include a minimum of three components and the finished set of working drawings must include all necessary drawing views, change orders and a parts list generated by the CADD system.

Methods of Evaluation

Each student will prepare a portfolio of their work and maintain a drafting log. The majority of the semester grade will be based on the quality and quantity of the work (presented in the portfolio) and the progress made during the semester. The remaining portion of the grade will be comprised of quizzes, tests, and the final exam.

Sample Test Question: Keys are used when gears, sheaves, and other similar items are assembled to a shaft. What kind and size key would you use to secure a six inch diameter double V-belt sheave to a one inch diameter shaft?

Adopted Texts and Other Instructional Materials

Textbooks

1. Goetsch, Chalk, Nelson *Technical Drawing* Edition: 4th 2000 -
2. Madsen *Geometric Dimensioning and Tolerancing* 2003 -

Other Texts

1. ANSI Standards: Dimensioning and Tolerancing. (YI4.5). 1994. Screw Threads. (Y14.6). I989. Surface Texture Symbols. (Y14.36). I996.
2. USB Flash drive
3. Log Book
4. 8-1/2 x 11 graph paper
5. Oberg, Johns, and Horton. Machinery's Handbook. 20th ed or newer edition. Industrial Press.

Instructional Materials

None

Student Learning Outcomes

1. ET145 SLO1 – Develop advanced compilation skills required to complete an engineering drawing. Compile data such as heat treatment, non- destructive testing, material specification, ect. and incorporate into an advanced engineering drawing.
2. ET145 SLO2 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete and advanced engineering drawings. CADD Software to include both 2D & 3D.
3. ET145 SLO3 – Obtain and apply all necessary drawing planning skills so at to plan and outline the steps to complete an involved project on a CADD system. Drawing planning to include title and tolerance blocks, notations, multi view drawing set-up and complete dimensioning, both general and advanced geometric dimensioning and tolerancing.
4. ET145 SLO4 - Use advanced CADD skills to produce 2D and 3D engineering drawings. 3D drawings to include use of assembly tools such as mates to construct 3D assemblies.

5. ET145 SLO5 - Apply advanced general and geometric tolerancing to an engineering drawing to fit two or more parts. Fully understand GD&T symbols and application to parts and assemblies.
6. ET145 SLO6 – Develop a complete drawing portfolio for use on a job interview. Portfolio contents to include drawing assignments from current and previous engineering drawing courses.

Distance Learning

This course is not Distance Learning.

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Board Approval: 05/18/2004
PCA Established: 05/18/2004
DL Conversion:
Date Reviewed:
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Engineering Technology (Masters Required)
Department: Industrial Technology
Prefix and Number: ET 160
Catalog Course Title: Digital Tools in Architecture
Banner Course Title: Digital Tools in Architecture

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	3.000	48.0 - 54.0	1.0
Total Hours	5.0	80.0 - 90.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Pass/No Pass

Requisites

Advisories
ARCH 111 Architectural Graphics & Design I

Entrance Skills

Upon entering this course, the student should be able to:

ARCH 111 - Architectural Graphics & Design I

- draw various architectural symbols that represent building materials as they are shown in the plan, section and elevation.
- draw symbolic graphics that represent trees, people, shrubbery, cars, skys, and ground cover.
- draw two-point perspectives of building exteriors.
- draw one-point perspectives of building interiors.
- draw axonometric drawings of buildings.

Catalog Description

Introduces computer design and presentation skills for architecture students. Topics include image editing, page layout and 3D modeling. This course is not open to students who are enrolled in or have received credit for Architecture 160.

Course Content

Lecture

1. Introduction to basic tools and commands: SketchUp, Photoshop, InDesign
2. Mass Modeling vs. Over Modeling, Groups & Components Part 1, Tips and Tricks
3. Groups & Components Part 2, Working with Circles, Arcs, Section ,Texture , Material
4. Tips and Tricks Part 2: Hidden Functions, Importing from CAD
5. The Cumulative Model Method Part 1, The Cumulative Model Method Part 2
6. Real World Model Assignment, Real World Modeling – in class workshop
7. Real World Model Workshop – continued, Complete Workshop Model
8. Using SketchUp with Photoshop, Working with Text & Dimensions
9. Setting up Slide Shows, Movie Making, Complete Movie exercise
10. Photoshop Environment & Analog to Digital
11. Scanning, Cropping, Image Editing, Fills, Actions, Selections
12. Layers, Basic Collage Rendering Process
13. Color Rendering Process-continued, Additional Collage Techniques
14. Creating Entourage Elements, Type
15. Paths, Miscellaneous Techniques
16. Introduction to InDesign environment, panels, documents and text.
17. Images, Drawings, text/paths/tools, techniques

Course Objectives

At the end of the course, the student will be able to:

1. 3D Modeling:
2. use three dimensional modeling tools to explore design problems and solutions.
3. use layers and views to organize, create, edit, and communicate models and their enclosed spaces.
4. create primitive forms and transform such forms by the addition and subtraction of various other forms and by editing points.
5. use various modification commands such as move, copy, rotate, scale, array
6. represent space and materials using realistic architectural surface styles.
7. render and export views and animations in a variety of formats.
8. Image Editing:
9. perform basic scanning and explain file size as it relates to image size and resolution.
10. make post scan adjustments using a variety of techniques and tools including levels, filters, cloning, and image and canvas sizing.
11. create and edit files using layers, layer masks and clipping masks.
12. perform image mode adjustments of highlight, shadow, and midrange values.
13. sharpen and/or resize an image with and without interpolation or major dilution of its original data.
14. define, save, load and manipulate selections and paths using a variety of selection tools and techniques.

15. develop architectural drawings/renderings using a variety of Photoshop tools, filters, collage and combinations to create the illusion of form, light and depth.
16. Page Layout:
17. specify text qualities such as styles, font, size, leading, kerning, color, etc.
18. use guidelines, grids, layers and styles to create and edit objects and layouts.
19. define pages and their organization and define and assign master pages.
20. draw open and closed paths, control their stroke and fill and manipulate them.
21. define, save and apply layers and colors.
22. attach text to paths and convert to graphics.
23. import graphics and images from other programs and compose and execute page layouts composed of text, images and graphic elements.
24. set and manipulate the number, location and size of pages.

Methods of Instruction

- **Lab**
- **Lecture**

Outside Assignments

- **Other Assignments**
  Writing assignments:
  1. Interview a local architect and write a one-page article discussing current uses and future trends in digital presentations
  2. Write a one-page comparative analysis discussing the pros and cons of Sketchup as they apply to the field of architecture.
  3. Write a one-page comparative analysis discussing the pros and cons of Photoshop as they apply to the field of architecture.
  4. Write a one-page comparative analysis discussing the pros and cons of In Design as they apply to the field of architecture.

Methods of Evaluation

1. At end of each discipline there will be a project, utilizing homework assignments.
2. Writing assignments.
3. The final will be a project utilizing all three different disciplines.
4. Quizzes.

Sample quiz questions:
1. Do you exchange files and information electronically with clients and consultants?
2. What are the pros and cons of Sketch Up as they apply to the field of architecture?
3. What are the pros and cons of Photoshop as they apply to the field of architecture?
4. What are the pros and cons of In-Design as they apply to the field of architecture?

Adopted Texts and Other Instructional Materials

Textbooks

1. Roskes, Bonnie *The SketchUP v.6 Workbook* 0 -
2. Benedict, William & Freeby, Brent *Digital Tools For Architecture: Abbreviated Software Manual For Selected Programs.* 2004 -

Other Texts

1. Cadalyst Magazine
2. www.sketchup.com
3. www.adobe.com
4. usb key or discs

Instructional Materials
None

Student Learning Outcomes

1. ET160 SLO1 - Develop graphic communication skills using digital media.
2. ET160 SLO2 - Edit and enhance digital images.
3. ET160 SLO3 - Create and edit various two and three- dimensional digital models.
4. ET160 SLO4 - Create digital presentation documents.
5. ET160 SLO5 - Share and convert digital files.

Distance Learning

This course is not Distance Learning.

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Board Approval: 05/16/2006
PCA Established: 05/16/2006
DL Conversion:
Date Reviewed: Spring 2017
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Electronics
Department: Industrial Technology
Prefix and Number: ET 162
Catalog Course Title: Fluid Power and Control
Banner Course Title: Fluid Power and Control

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	0.000	0.0 - 0.0	0.0
Total Hours	2.0	32.0 - 36.0	2.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade Only

Requisites

None

Entrance Skills

None

Catalog Description

An introduction to the generation, control and basic applications of hydraulics and pneumatics force and motion systems. Topics include safety, properties of and forces in liquids, pumps, motors, valves, reservoirs, strainers, filers, accumulators, basic diagramming, system design and troubleshooting. This course is not open to students who are enrolled in or have received credit for CEL 162 or EL 162.

Course Content

Lecture

1. Introduction to Fluid Power
2. Physical Properties of Fluids
3. Energy and Power in Fluid Power Systems
4. Losses in Hydraulic Pipelines
5. Fluid Power Motors and Pumps
6. Cylinders and Cushioning Devices

7. Valve Construction and Operation
8. Basic Electrical Controls for Fluid Power Circuits
9. Fluid Logic Control Systems
10. Designing and Troubleshooting Fluid Power Systems

Course Objectives

At the end of the course, the student will be able to:

1. apply safety procedures and issues in the areas of hydraulics and pneumatics.
2. identify and describe a basic hydraulic and pneumatic system and their components.
3. explain the construction and operation of fluid power cylinders.
4. explain the construction and operation of directional control valves.
5. explain the operations of fluid power components such as filters, regulators, lubricators, needle valves, check valves, flow control valves, and quick exhaust valves.
6. explain the construction and the operation of common fluid power circuits.
7. design basic fluid power systems using schematic diagrams to document designs.
8. identify common hydraulic and pneumatic component failures and symptoms.
9. identify symptoms of common pump failures.
10. describe the basic repairs needed to restore pump operation.
11. describe the electrical control of fluid power components.

Methods of Instruction

- **Lecture**

Outside Assignments

- **Other Assignments**
  Cooperative learning group projects; presentations; short papers; research; and the following:
  1. readings from adopted text and instructor handouts; evaluate sample problems and work end of chapter problems.
  2. use computer applications to expand upon circuit analysis and comprehension.
  3. use the Internet, as an information resource, to support topics studied in this course.
  4. online practice quizzes and take-home exams covering assigned and related topics.
  5. design projects assigned stressing application of learned concepts and theories.

  Sample writing assignments:
  1. Describe Pascal's Law as it relates to fluid power.
  2. Explain why gases are used for some fluid systems and liquids are used in others.

Methods of Evaluation

- **Exams/Tests**
- **Papers**
- **Projects**
- **Group Projects**
- **Class Participation**
- **Home Work**
- **Other**
  Cooperative learning group projects; presentations; short papers; research; and the following:
  1. readings from adopted text and instructor handouts; evaluate sample problems and work end of chapter problems.
  2. use computer applications to expand upon circuit analysis and comprehension.
  3. use the Internet, as an information resource, to support topics studied in this course.
  4. online practice quizzes and take-home exams covering assigned and related topics.
  5. design projects assigned stressing application of learned concepts and theories.

Sample writing assignments:
1. Describe Pascal's Law as it relates to fluid power.
2. Explain why gases are used for some fluid systems and liquids are used in others.

Adopted Texts and Other Instructional Materials

Textbooks

1. Esposito, A. *Fluid Power with Applications* Edition: 7th 2013 -
2. NIDA Corp *Hydraulic and Pneumatic Systems* 2012

Other Texts

1. Instructor handouts
2. Course's blackboard website for tutorials and supplements.
3. NIDA Corporation Homework Disk 2
4. Software tools (supplied by instructor and textbook bundle)
5. J. Johnson. Introduction to Fluid Power. Thomson.
6. D. Norvelle. Fluid Power Technology. Thomson.

Instructional Materials

1. Graph paper / school supplies
2. Data storage device (USB)
3. Scientific calculator

Student Learning Outcomes

1. ET162 SLO1 - Demonstration basic safety procedures.
2. ET162 SLO2 - Demonstrate the understanding of basic concepts and procedures for hydraulics and pneumatics.
3. ET162 SLO3 - Design basic fluid power systems using standard engineering practices.

Distance Learning

This course is not Distance Learning.

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Board Approval:
PCA Established:
DL Conversion:
Date Reviewed:
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: None
Department: Industrial Technology
Prefix and Number: ET 189
Catalog Course Title: Independent Projects
Banner Course Title: Independent Projects

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	-	-	-
Lab	3.000 - 9.000	48.0 - 54.0 to 144.0 - 162.0	1.0 - 3.0
Total Hours	3.0 - 9.0	48.0 - 54.0 to 144.0 - 162.0	1.0 - 3.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade or Pass/No Pass

Requisites

None

Entrance Skills

None

Catalog Description

Acceptable for credit: CSU, UC-Determined after admission Courses for students capable of independent work who demonstrate the need or desire for additional study beyond the regular curriculum. Enrollment allows students to pursue activities such as directed field experience, research, or development of skills and competencies under faculty advisement and supervision. Independent projects may be earned in most disciplines. Students wishing to enroll in Independent Projects should contact the appropriate instructor identified in the class schedule. If the project proposed is acceptable to that instructor, a contract will be developed. All contracts for these classes must be completed and submitted to the Records Office no later than the end of the second week of the semester. Students may enroll for any combination (unit value) of Independent Projects 189 and/or 389 for a total of four semesters in a specific discipline. Units are awarded depending upon satisfactory performance and the amount of time committed by the student to the course. Allowable units vary according to discipline, and are based on the following formula: 1 unit - 48 hours per semester 2 units - 96 hours per semester 3 units - 144 hours per semester

Course Content

Lecture
N/A

Course Objectives

None

Methods of Instruction

None

Outside Assignments

None

Methods of Evaluation

None

Adopted Texts and Other Instructional Materials

Textbooks
None

Other Texts
None

Instructional Materials
None

Student Learning Outcomes

None

Distance Learning

This course is not Distance Learning.

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Board Approval: 10/13/2015
PCA Established:
DL Conversion:
Date Reviewed: Fall 2015
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Auto Body Technology or Automotive Technology or Electronic Technology or Machine Tool Technology or Welding

Department: Industrial Technology

Prefix and Number: ET 370

Catalog Course Title: SkillsUSA

Banner Course Title: SkillsUSA

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	3.000	48.0 - 54.0	3.0
Lab	0.000	0.0 - 0.0	0.0
Total Hours	3.0	48.0 - 54.0	3.0

Number of Times Course may be Repeated
3

Grading Method
Letter Grade or Pass/No Pass

Requisites

None

Entrance Skills

None

Catalog Description

SkillsUSA is a partnership of students, teachers and industry working together to ensure America has a skilled workforce. This SkillsUSA course prepares students for employment and inter-collegiate competition in Career Technical Education.

Students will learn to plan projects, work in teams, solicit community support and develop a range of skills valued by employers.

Students registered for this class may not register for AB 370, ARCH 370, AT 370, EL 370, MT 370 or WLDT 370 during the same semester.
Participation in the SkillsUSA competition is required. This course may be repeated up to three times for credit with different competitions.

Course Content

Lecture

1. Resume preparation and mock interviews
2. Community service
3. SkillsUSA chapter publicity
4. Fundraising and budgeting
5. Preparations for SkillsUSA competition

Course Objectives

At the end of the course, the student will be able to:

1. Gather data, research, evaluate, and use appropriate information to plan and complete a multi-faceted project.
2. Enlist community support for educational projects.
3. Assume responsibility for meeting deadlines, maintaining budgets and completing projects.
4. Evaluate contest preparations for completeness, clarity, and presentation.

Methods of Instruction

- **Demonstration**
- **Discussion**
- **Lecture**
- **Service Learning**

Outside Assignments

- **Outside Assignments**
  1. Contact businesses to promote SkillsUSA competition and gain sponsorships.
  2. Use the Internet to research SkillsUSA.
  3. Complete and submit regular worksheets.
  4. Use the Internet to research particular disciplines.
- **Sample Assignment(s)**
  Sample Writing Assignment:
  In at least one paragraph, relate the SkillsUSA competition to Career and Technical Education (CTE).

Methods of Evaluation

- **Research Projects**
- **Papers**
- **Oral Presentation**
- **Group Projects**
- **Class Participation**

Adopted Texts and Other Instructional Materials

Textbooks

1. SkillsUSA *SkillsUSA Professional Development Starter Kit and Student Workbook Levels 1-5* Edition: 2014 2014

Other Texts
None

Instructional Materials
None

Student Learning Outcomes

1. ET370 SLO1 - Gather data, research, evaluate, and use appropriate information to plan and complete a multi-faceted project.
2. ET370 SLO2 - Enlist community support for educational projects.
3. ET370 SLO3 - Assume responsibility for meeting deadlines, maintaining budgets and completing projects.
4. ET370 SLO4 - Evaluate contest preparations for completeness, clarity, and presentation.

Distance Learning

This course is not Distance Learning.

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Board Approval:
PCA Established:
DL Conversion:
Date Reviewed:
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: None
Department: Industrial Technology
Prefix and Number: ET 389
Catalog Course Title: Independent Projects
Banner Course Title: Independent Projects

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	-	-	-
Lab	-	-	-
Total Hours	0.0	0.0 - 0.0	0.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade or Pass/No Pass

Requisites

None

Entrance Skills

None

Catalog Description

Acceptable for credit: CSU, UC-Determined after admission Courses for students capable of independent work who demonstrate the need or desire for additional study beyond the regular curriculum. Enrollment allows students to pursue activities such as directed field experience, research, or development of skills and competencies under faculty advisement and supervision. Independent projects may be earned in most disciplines. Students wishing to enroll in Independent Projects should contact the appropriate instructor identified in the class schedule. If the project proposed is acceptable to that instructor, a contract will be developed. All contracts for these classes must be completed and submitted to the Records Office no later than the end of the second week of the semester. Students may enroll for any combination (unit value) of Independent Projects 189 and/or 389 for a total of four semesters in a specific discipline. Units are awarded depending upon satisfactory performance and the amount of time committed by the student to the course. Allowable units vary according to discipline, and are based on the following formula: 1 unit - 48 hours per semester 2 units - 96 hours per semester 3 units - 144 hours per semester

Course Content

Lecture
N/A

Course Objectives

None

Methods of Instruction

None

Outside Assignments

None

Methods of Evaluation

None

Adopted Texts and Other Instructional Materials

Textbooks
None

Other Texts
None

Instructional Materials
None

Student Learning Outcomes

None

Distance Learning

This course is not Distance Learning.

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COURSE OUTLINES
(IN REVIEW)

Board Approval: 12/12/2006
PCA Established:
DL Conversion:
Date Reviewed: Spring 2006
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Engineering Technology (Masters Required)
Department: Industrial Technology
Prefix and Number: ET 100
Catalog Course Title: Computer Aided Drafting and Design
Banner Course Title: Computer Aided Drafting

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	3.000	48.0 - 54.0	1.0
Total Hours	5.0	80.0 - 90.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Letter Grade or Pass/No Pass

Requisites

None

Entrance Skills

None

Catalog Description

An introduction to computer-aided drafting and design (CADD) which covers operation of a computer graphics terminal (specifically AutoCAD) to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings.

Course Content

Lecture

1. Introduction to CADD
2. System-Hardware Description and Operation
3. System Operating Modes

4. Drawing File Structure including Storing and Loading Files
5. CADD Software
6. Creating Drawings
7. Command Entry Methods
8. Creation and Manipulation of Drawing Data
9. Modifying the Geometry and the Drawing
10. Text
11. Dimensioning
12. Plotting
13. Creating a Parts Library; Symbols, and Macros
14. CADD/CAM Links

Course Objectives

At the end of the course, the student will be able to:

1. demonstrate proficiency in applying visualization techniques.
2. apply basic and advance AutoCAD drawing techniques to create objects.
3. apply basic and advance AutoCAD editing techniques to modify objects.
4. annotate drawings accurately including adding text, working with tables, and dimensioning drawings.
5. set up paperspace layouts for plotting using industry standard techniques, including multiple layouts and multiple scale viewports.

Methods of Instruction

- **Demonstration**
- **Lab**
- **Lecture**

Outside Assignments

- **Outside Assignments**
  Visit one of the locations listed and select a device, not too complicated, to sketch. Make a rough sketch (for your use only) for later use in a drafting class. Be prepared to sketch the device, while describing its attributes (shape, size, function, material, aesthetic properties, etc.) to either another student or at the board, to the class.
  a. metal shop
  b. wood shop
  c. electronic shop
  d. hardware store
  e. garage
  f. computer store

Methods of Evaluation

- **Exams/Tests**
- **Quizzes**

- **Portfolios**
- **Projects**
- **Home Work**
- **Lab Activities**
- **Other**

  The following will be considered in the examination and evaluation of student work:
  1. Correct 3D spatial visualization of parts.
  2. Accurate 2D and 3D CAD representation of parts including correct dimensioning and tolerncing.
  3. Accurate CAD representation of multiview drawings.

Adopted Texts and Other Instructional Materials

Textbooks

1. Richard, Paul F. and Fitzgerald, Jim *Introduction to AutoCAD 2017: A Modern Perspective* 2016

Other Texts

1. 1.128 k (min) flash drive
2. Shumaker, T. and Madsen, D. AutoCAD and Its Applications Basics. 2016

Instructional Materials

None

Student Learning Outcomes

1. ET100 SLO1 - explain the function of the three major components of a CADD system processor (processing section, memory section, and data transfer).
2. ET100 SLO2 - perform keying, cursor control, and digitizing tasks on a CADD system
3. ET100 SLO3 - use input commands for accomplishing drafting tasks on a CADD system.
4. ET100 SLO4 - perform various manipulation commands on a CADD system.
5. ET100 SLO5 - secure a hardcopy of data that appears on a graphics display.
6. ET100 SLO6 - set up a plotter, load the media, and give the plot commands to produce a hardcopy.

Distance Learning

This course is not Distance Learning.

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Board Approval: 04/15/1986
PCA Established:
DL Conversion:
Date Reviewed: Fall 2006
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Engineering Technology (Masters Required)
Department: Industrial Technology
Prefix and Number: ET 140
Catalog Course Title: Engineering Drawing
Banner Course Title: Engineering Drawing

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	4.000	64.0 - 72.0	1.0
Total Hours	6.0	96.0 - 108.0	3.0

Number of Times Course may be Repeated
3

Grading Method
Letter Grade or Pass/No Pass

Requisites

Prerequisite
ET 100 Computer Aided Drafting and Design

Entrance Skills

Upon entering this course, the student should be able to:

ET 100 - Computer Aided Drafting and Design

- explain the function of the three major components of a CADD system processor (processing section, memory section, and data transfer).
- perform keying, cursor control, and digitizing tasks on a CADD system.
- use input commands for accomplishing drafting tasks on a CADD system.
- perform various manipulation commands on a CADD system.
- secure a hardcopy of data that appears on a graphics display.
- set up a plotter, load the media, and give the plot commands to produce a hardcopy.

Entrance Skills Other (Legacy)

1. explain the function of the three major components of a CADD system processor (processing section, memory section, and data transfer).

2. perform keying, cursor control, and digitizing tasks on a CADD system.
3. use input commands for accomplishing drafting tasks on a CADD system.
4. perform various manipulation commands on a CADD system.
5. secure a hardcopy of data that appears on a graphics display.
6. set up a plotter, load the media, and give the plot commands to produce a hardcopy.

Catalog Description

The principles and application of engineering drawing, including orthographic projections, freehand sketching, pictorial drawings, engineering lettering, dimensioning, sections, auxiliary, surface finish, standard and geometric tolerancing, threads, and fasteners are the core of this course. A computer aided drafting system (CAD) will be used extensively by the student to complete the requirements of this course.

Course Content

Lecture

1. Orthographic Projection
2. Freehand Sketching
3. Pictorial Drawings
4. Lettering
5. Dimensioning
6. Sectioning
7. Auxiliary Views
8. Surface finish
9. Standard Tolerancing
    a. fit between mating parts
    b. specification of tolerances
    c. American National Standards
    d. accumulation of Tolerances
10. Geometric Tolerancing
11. Threads and Fasteners

Course Objectives

At the end of the course, the student will be able to:

1. use freehand sketching to convey a technical idea or concept.
2. use a CADD system to develop and produce working drawings to current industrial standards.
3. use a CADD system to: A. create, store, and retrieve "parts" from a CADD library. B. construct a working drawing using multiviews, pictorials, sections, and auxiliary views. C. dimension and tolerance working drawings to current industrial standards. D. place geometric tolerances and symbols to engineering drawings.

Methods of Instruction

- **Demonstration**
- **Lab**
- **Lecture**

Outside Assignments

- **Outside Assignments**
  Research the internet for information about the CAD software SOLIDWORKS.
  Write a 250 word essay, include images and sketches, about the advantages and application of SOLIDWORKS.

Methods of Evaluation

- **Exams/Tests**
- **Quizzes**
- **Portfolios**
- **Projects**
- **Home Work**
- **Other**
  Each student will prepare a portfolio of their work and maintain a drafting log. The majority of the semester grade is based on the quality/quantity of the work (presented in the portfolio) and progress made during the semester. The remaining portion of the grade will be comprised of quizzes, tests and the final exam.

  Sample Test Question:
  Give the proper ANSI Y14.5M symbol for the following: at maximum material condition, regardless of feature size, reference dimension, counterbore/spotface, and spherical radius.

Adopted Texts and Other Instructional Materials

Textbooks

1. Goetsch, Chalk, Nelson *Technical Drawing* Edition: 5th 2005 -
2. Madsen *Geometric Dimensioning and Tolerancing* Edition: 9th 2012 -

Other Texts

1. ANSI Standards: Dimensioning and Tolerancing. (YI4.5). 1994. Screw Threads. (Y14.6). I989. Surface Texture Symbols. (Y14.36). I996.
2. Oberg, Johns, and Horton. Machinery's Handbook. 20th ed or newer edition. Industrial Press.

Instructional Materials

1. Log book
2. Graph paper 8.5 x 11
3. Data storage device (USB)

Student Learning Outcomes

1. ET140 SLO1 - Develop the necessary skills to read and apply engineering handbooks, material specifications, codes, engineering instructions, etc. to engineering drawings.
2. ET140 SLO2 - Be able to use 2D computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete engineering drawings. Ability to use advanced CADD commands.
3. ET140 SLO3 – Construct working drawings using multi views, pictorials, sections, and auxiliary views. Working drawings to include title block, tolerance block, & notations.
4. ET140 SLO4 - Develop the skills to apply general dimensioning and tolerancing to current engineering standards. Develop understanding of fits between parts.
5. ET140 SLO5 - Develop the understanding of geometric dimensioning and tolerancing. Understand symbols and application.
6. ET140 SLO6 - Be able to create an assembly drawing project to completion. To include creation of a bill of material.
7. ET140 SLO7 - Be able to use a 3D CADD program to create simple 3D models.

Distance Learning

This course is not Distance Learning.

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Board Approval: 04/15/1986
PCA Established:
DL Conversion:
Date Reviewed: Fall 2017
Catalog Year: None

Allan Hancock College
Course Outline

Discpline Placement: Engineering Technology (Masters Required)
Department: Industrial Technology
Prefix and Number: ET 145
Catalog Course Title: Advanced Engineering Drawing
Banner Course Title: Advanced Engineering Drawing

Units and Hours

	Hours per Week (Based on 16 Weeks)	Total Hours per Term (Based on 16-18 Weeks)	Total Units
Lecture	2.000	32.0 - 36.0	2.0
Lab	4.000	64.0 - 72.0	1.0
Total Hours	6.0	96.0 - 108.0	3.0

Number of Times Course may be Repeated
None

Grading Method
Pass/No Pass

Requisites

Prerequisite
ET 140 Engineering Drawing

Entrance Skills

Upon entering this course, the student should be able to:

ET 140 - Engineering Drawing

- use freehand sketching to convey a technical idea or concept.
- use a CADD system to develop and produce working drawings to current industrial standards.
- use a CADD system to: A. create, store, and retrieve "parts" from a CADD library. B. construct a working drawing using multiviews, pictorials, sections, and auxiliary views. C. dimension and tolerance working drawings to current industrial standards. D. place geometric tolerances and symbols to engineering drawings.

Entrance Skills Other (Legacy)

1. use freehand sketching to convey a technical idea or concept.
2. use a CADD system to develop and produce working drawings to current industrial standards.

3. use a CADD system to:

    a. create, store, and retrieve "parts" from a CADD library.

    b. construct a working drawing using multiviews, pictorials, sections, and auxiliary views.

    c. dimension and tolerance working drawings to current industrial standards.

    d. place geometric tolerances and symbols to engineering drawings.

Catalog Description

Use of advanced technical drawing techniques on a CADD system to solve design component problems requiring details and assemblies. The course covers freehand sketching to develop ideas, fabrication and working drawings dimensioned to ANSI standards, including tolerances, title blocks, change orders, symbols and notes. Use of handbooks, ordinances, codes, selection of hardware and materials will be incorporated in each student's individual project.

Course Content

Lecture

1. Freehand Sketching to Develop Preliminary Ideas in Preparation for Work on CADD Terminal.
2. Preparation of Working Drawing of a Complete System or Component; Selection and Use of Standards Hardware, Fabrication and Detail Drawings.
3. Use of CADD System to Develop: Assembly Drawings; Material/Part List.
4. Scale
5. Dimensioning to Current ANSI Standards.
6. Title Blocks, Change Orders, Symbols and Notes.
7. The Use of "Handbooks".
8. Use of Related Codes and Ordinances.
9. Geometric Tolerancing to Fit Two or More Parts.

Course Objectives

At the end of the course, the student will be able to:

1. evaluate and apply related codes, ordinances and regulations to complete working drawings.
2. apply the capabilities of a CADD system to develop and produce advanced working drawings to current industrial standards.
3. plan and outline the necessary information or steps to complete an involved project on a CADD system prior to booting up the system.
4. select and initiate the macro's and files necessary for a CADD system to produce a material or parts list from an assembly drawing.
5. apply geometric tolerancing to an engineering drawing to fit two or more parts.

Methods of Instruction

- **Demonstration**
- **Lab**
- **Lecture**

Outside Assignments

- **Outside Assignments**

Use textbooks, and the internet to conduct a research of The American Society of Mechanical Engineers (ASME) tolerance rules. Prepare a 250 word presentation with examples and images showing methods of specifying tolerances in an engineering drawing.

Methods of Evaluation

- **Exams/Tests**
- **Quizzes**
- **Portfolios**
- **Other**

  Each student will prepare a portfolio of their work and maintain a drafting log. The majority of the semester grade will be based on the quality and quantity of the work (presented in the portfolio) and the progress made during the semester. The remaining portion of the grade will be comprised of quizzes, tests, and the final exam.

  Sample Test Question: Keys are used when gears, sheaves, and other similar items are assembled to a shaft. What kind and size key would you use to secure a six inch diameter double V-belt sheave to a one inch diameter shaft?

Adopted Texts and Other Instructional Materials

Textbooks

1. Goetsch, Chalk, Nelson *Technical Drawing* Edition: 5th 2005 It is still available and used in the industry.
2. Madsen *Geometric Dimensioning and Tolerancing* Edition: 9th 2012 -

Other Texts

1. ANSI Standards: Dimensioning and Tolerancing. (YI4.5). 1994. Screw Threads. (Y14.6). I989. Surface Texture Symbols. (Y14.36). I996.
2. Oberg, Johns, and Horton. Machinery's Handbook. 20th ed or newer edition. Industrial Press.

Instructional Materials

1. Data storage device (USB)
2. Log book
3. Graph paper 8.5 x 11

Student Learning Outcomes

1. ET145 SLO1 – Develop advanced compilation skills required to complete an engineering drawing. Compile data such as heat treatment, non- destructive testing, material specification, ect. and incorporate into an advanced engineering drawing.
2. ET145 SLO2 - Be able to use computer-aided drafting and design CADD software to create, modify, delete, transfer, and plot graphic files used to produce complete and advanced engineering drawings. CADD Software to include both 2D & 3D.
3. ET145 SLO3 – Obtain and apply all necessary drawing planning skills so at to plan and outline the steps to complete an involved project on a CADD system. Drawing planning to include title and tolerance blocks, notations, multi view drawing set-up and complete dimensioning, both general and advanced geometric dimensioning and tolerancing.
4. ET145 SLO4 - Use advanced CADD skills to produce 2D and 3D engineering drawings. 3D drawings to include use of assembly tools such as mates to construct 3D assemblies.
5. ET145 SLO5 - Apply advanced general and geometric tolerancing to an engineering drawing to fit two or more parts. Fully understand GD&T symbols and application to parts and assemblies.
6. ET145 SLO6 – Develop a complete drawing portfolio for use on a job interview. Portfolio contents to include drawing assignments from current and previous engineering drawing courses.

Distance Learning

This course is not Distance Learning.

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