Engineering Technology Advisory		
MINUTES FOR Tuesday, February 27, 2018	**3:30pm**	**Applied Science and Business, AS102**
Members Present:	Becker, Zerryl – Dean, Applied Science and Business, COD Bibo, Kevin – Assistant Principal CTE, Palm Desert HS Brown, George – HVAC Instructor, COD Cantabrana, Luis – MSA Consulting Cota, Jesse – Teacher, Desert Mirage HS De La Torre, Matthew – VP, Engineering, Renova Solar Corporation Gomez, Juan – Teacher, Coachella Valley USD Gonzalez, David – Consultant, COD Hildebrand, Mylo – Teacher, Indio HS Lopez, Cesar – Engineering Manager, Renova Solar Corporation McLaughlin, Larry – Advisory Chair, Deputy Sector Navigator, COD Perotti, Marie – CTE Coordinator, Coachella Valley USD Pinning, Steve – CTE Director, Palm Springs USD Pompa, Manuel – Senior Designer, MSA Consulting Wren, Maria – CEO, Smart Education	
Members not Present:		
Guest(s):		
Recorder:	Prudence Bailey, CTE Transitions Specialist	

AGENDA

1. Call to Order/Roll Call (3:30pm)	
Larry McLaughlin welcomed the group and expressed the purpose of the meeting is to share information about the planning of a new Engineering Technology certificate to be offered at College of the Desert and to obtain valuable input from high school educators and industry partners to ensure the certificate meets both the needs of the students and the industry demands. Additionally, middle schools and high schools are currently offering STEM programs which are creating an interest in engineering. Larry introduced Zerryl Becker, Dean of Applied Science and Business who is an advocate for the certificates and wants to create clear pathways that open doors for students. Zerryl shared that the State recently reduced the amount of credits needed for certificated to six units.	
2. Action Item(s)	
2.1 Approval of Agenda	
DISCUSSION	Presentation handouts will serve as the agenda.
CONCLUSION	Agenda approved as submitted.
3. Presentation of Proposed Engineering Degree by David Gonzalez (see handout)	
3.1 Purpose	
DISCUSSION	The purpose of the new engineering degree (with stackable certificates) is to bridge high school students currently enrolled in engineering-related studies

	into a college-level program and establish an engineering pathway for Coachella Valley students.
CONCLUSION	
3.2 Engineering Technology Degree (see handout)	
DISCUSSION	Degree will include the following sections: • Introductory course in Robotics • Electronic Circuits • Computer Numerical Control (modeled closely to Palm Desert High School's Computer Integrated Manufacturing class) • Programmable Logic Controllers • Industrial Machines
CONCLUSION	
3.3 Stackable Certificates (see handout)	
DISCUSSION	There will be three stackable certificates that will allow students to achieve a certificate as they continue through the degree program. These certificates will include: • Electronics Technology Courses include: Focus on Electronic Circuits, DC, AC, and Digital). This certificate will mostly be hands-on. • Robotics Automation Courses will include: Robotics and DC Circuit Intro course, Focus on Computer Numerical Control – CNC Mill, and Integrate curriculum from Palm Desert HS's Computer Integrated Manufacturing class • Remote Automation Courses will include: Robotics and DC Circuit Intro course and focus on programmable logic controllers and industrial controllers) The term "remote", as it is used in this course title, means devices that can be programmed and left alone. Courses will range from one to four units credit and offered in eight-week sessions, with limited to no prerequisites.
CONCLUSION	
3.4 Alternating Schedule (see handout)	
DISCUSSION	The proposed schedule will be modeled after the ACR/HVAC program schedule which has proved to be very successful. It will allow for multiple entry (morning and evening classes) and will alternate between Fall and Spring semesters.
CONCLUSION	
3.5 Labor Market Indicators (see handout)	
DISCUSSION	There will be an 11% employment increase through 2021 in the Inland Empire / Desert Region. This equates to nearly 14,500 job openings in related occupations, with Riverside, Ontario, and Corona being the top worksite regional cities.
CONCLUSION	

3.6 Group Discussion –Pathways for Students (grouped by topic, not in the order in which it was discussed)	
DISCUSSION	Marie Perotti shared that is can be difficult for secondary schools to articulate the college course because they have to meet State pathway requirements and curriculum must meet A-G college readiness requirements, which often conflicts with COD's structure for curriculum. She also expressed that it is important to align the course hours required by COD with high school curriculum. While this can be a challenge, she has found that it can be easier for the high school to adjust its curriculum to fit the COD curriculum. She shared how articulation has worked in CVUSD with Agriculture and Information Technology. She also suggested that if curriculum has not been set, it should be a collaborative effort between COD faculty and high school teachers to write the curriculum. Steve Pinnings asked "What criteria does COD have for students entering the program?" David answered, "Students simply need to be interested". Mylo Hildebrand shared that he already teaches a lot of the proposed courses, but not in-depth, so offering the certificates will allow for students to get greater knowledge in each subject. Zerryl Becker gave an example of how the curriculum for COD's Digital Design and Production (DDP) course was altered to be 1 unit, instead of 3, to better match how the course was taught at the high school level where each course is partially taught each year during 10^{th} – 12^{th} grades. However, there was a very small number of students who passed the exam. Marie Perotti asked what the anticipated capacity was for the programs, since current COD students have priority during registration which may fill up the class, leaving limited or no room for high school students to register. In response, Dean Becker shared that all CTE classes, with the exception of some health and nursing classes, are available and do not reach capacity. The department is also working to establish a set offering of courses for each certificate which will guarantee classes will be offered as stated. She also shared that certificates do not require general education course be taken and financial aid allows for up to 90 units to be taken. With general education courses consisting of 18 units, this means students could potentially acquire 4-5 certificates prior to transferring to a university. Steve Pinning asked "What is the remediation pathway for students who are currently participating in an engineering program in high school that may want to take some of the certificate courses"? Dean Becker shared that while she did not have an answer to the question, she is continuously working to keep the doors open for students.
CONCLUSION	COD values the input of high school teachers and industry partners and wants to work as collaboratively as possible to ensure there are no closed doors for students. Efforts to collaborate on curriculum will continue.

FOLLOW-UP ITEMS	PERSON RESPONSIBLE	DEADLINE
Follow-up with high-school teachers to collaborate on curriculum, as needed.	Zerryl Becker	

3.7 Group Discussion – Suggested Curriculum and Software Program Changes or Additions

DISCUSSION	There was a unanimous consensus among both educators and industry partners that AutoCad should be included in the curriculum. All of the high school educators shared they are currently using AutoCad in their classrooms. Jesse Cota expressed that manual drafting should also be included in the curriculum. COD current offers DRA 001 and DRA 002. He currently uses the AutoDesk suite (includes AutoCad). Mylo Hilderbrand currently uses Inventor.
CONCLUSION	Based on feedback, Dean Becker suggested there is a need to create a certificate for AutoCad

FOLLOW-UP ITEMS	PERSON RESPONSIBLE	DEADLINE
COD team will review all the suggestions provided and work to incorporate into the proposed curriculum.	Larry McLaughlin / David Gonzalez	

3.8 Group Discussion – Labor Market

DISCUSSION	Larry McLaughlin proposed the following questions: • What knowledge and/or skills will aid students in preparing for the labor market? • Are there any jobs not represented on the labor market handout that should be considered? • For industry partners, is there room for internship or work experience at your organization When asked if there are any industry recognized credentials or certifications that a student enrolled in such a program could pursue and obtain, it was stated that there is a series of AutoCad related certifications and levels. When asked to review the LMI list of occupations and suggest any that may have been excluded, no additional occupations were suggested. Luis Cantabrana shared that the position of designer is more prevalent in the labor market than the position of drafter. He also suggested that knowledge of California electrical codes (BIT 040) it vital for entry-level positions. Mylo Hildebrand suggested that knowledge of Computer Numerical Control (CNC) is also necessary. Matthew De La Torre suggested an engineering communications course would be valuable. He also shared Renova Solar has both part-time positions and summer work/internship opportunities. Manuel Pompa shared that MSA Consulting has had a summer intern/worker, although she was a relative of someone at the company.

CONCLUSION		
FOLLOW-UP ITEMS	PERSON RESPONSIBLE	DEADLINE
COD team will review all the suggestions provided and work to incorporate into the posed curriculum.	Larry McLaughlin / David Gonzalez	
4. Adjournment: 5:08pm		

NEXT MEETING: Not set at this time. Larry McLaughlin will keep advisory members informed on progress and date for next meeting.

NEW ENGINEERING TECHNOLOGY PROGRAM

COLLEGE OF THE DESERT – APPLIED SCIENCES

OUTLINE

1. **Purpose**
2. **Engineering Technology Degree**
3. **Stackable Certificates**
    1. Electronics Technology
    2. Robotics Automation
    3. Remote Automation
4. **Alternating Schedule/Multiple Entry**
5. **Labor Market Indicators**

PURPOSE

- **Bridge high school students currently in engineering-related studies into a college level program:**
  - Careers
  - Transfer to a 4-year institution, with additional courses
- **Establish an engineering pathway for Coachella Valley students**
  - Have interest
  - Not necessarily the academic credentials for a 4-year program

ENGINEERING TECHNOLOGY DEGREE

- **Intro Course in Robotics**
- **Electronic Circuits**
- **Computer Numerical Control**
  - PDHS Computer Integrated Manufacturing
- **Programmable Logic Controllers**
- **Industrial Machines**

STACKABLE CERTIFICATES

1. Electronics Technology
2. Robotics Automation
3. Remote Automation

ELECTRONICS TECHNOLOGY CERT.

- Focus on Electronic Circuits
- DC
- AC
- Digital

ROBOTICS AUTOMATION CERT.

- **Robotics and DC Circuit Intro Course**
- **Focus on Computer Numerical Control**
  - CNC Mill
- **Integrate PDHS Computer Integrated Manufacturing**

REMOTE AUTOMATION CERT.

- **Robotics and DC Circuit Intro Course**
- **Focus on**
  - Programmable Logic Controllers
  - Industrial Controllers

ALTERNATING SCHEDULE

- **Multiple Entry: Morning and Evening**
- **Alternate between Fall and Spring**
- **Similar to ACR/HVACR**

ACR/HVACR

	FALL	WINTER	SPRING	SUMMER
MORNING	Weeks 1-8 | Weeks 9-16 Tuesday & Thursday ACR 064 | ACR 065 Weeks 1-8 | Weeks 9-16 Monday & Wednesday ACR 080 | ACR 083	Winter Inter-session Morning M, T, W, TH, F ACR 077	Weeks 1-8 | Weeks 9-16 Tuesday & Thursday ACR 060 | ACR 061 Weeks 1-8 | Weeks 9-16 Monday & Wednesday ACR 076 | ACR 075	Summer Session Morning Monday & Wednesday ACR 078 Tuesday & Thursday ACR 077
EVENING	Weeks 1-8 | Weeks 9-16 Tuesday & Thursday ACR 060 | ACR 061 Weeks 1-8 | Weeks 9-16 Monday & Wednesday ACR 076 | ACR 075	Winter Inter-session Morning M, T, W, TH, F ACR 078	Weeks 1-8 | Weeks 9-16 Tuesday & Thursday ACR 064 | ACR 065 Weeks 1-8 | Weeks 9-16 Monday & Wednesday ACR 080 | ACR 083	

LABOR MARKET INDICATORS

- **11% employment increase through 2021 in the Inland Empire / Desert Region**
- **Nearly 14,500 job openings**
- **Riverside, Ontario, and Corona are the top worksite regional cities**

THANK YOU

DRAFT

ASSOCIATE OF APPLIED SCIENCE

ENGINEERING TECHNOLOGY

The catalog in force is assigned to students based on the academic year they first applied to the college, and changes only when students change their major or request the change in writing.

1819 Catalog
Effective Fall 2019

Applied Engineering Division — *Applied Sciences Department*

TECHNICAL Course Number	Course Title	Credits	Pre- and Co-Requisites	Completed Sem./Year
AENG 009	Introduction to Robotics	2		
AENG 010A	Computer Numerical Control IA	1		
AENG 010B	Computer Numerical Control IB	2		
AENG 011	Computer Numerical Control II	3		
AENG 020	DC Circuit Analysis I	3		
AENG 021	DC Circuit Analysis II	3		
AENG 030	PLCs and Industrial Controls I	3		
AENG 031	PLCs and Industrial Controls II	3		
AENG 050	Digital Logic Analysis	3		
AENG 022	AC Circuit Analysis	4		
ESYS 002	Electricity & Electrical Theory	3		
AENG 060	Industrial Electronics	4		
AENG 061	Industrial Sensors and Advanced Applications	2		
ESYS 095A	Energy Systems Technology Work Experience	1		
Select 3 units from the following:				
ACR 064	Air Conditioning & Refrigeration Electricity I	3		
ACR 090	Building Automation Fundamentals	3		
ACR 091	Advanced Building Control Networks	3		
AENG 024	Manufacturing of Circuits	3		
AUTO 011B	Auto Electronics & Electrical Systems	4		
BIT 040	California Electrical Codes	2		

CIS 010	Computer Literacy	4		
CIS 086	Visual Basic Programming	3		
ESYS 003	Energy Systems Technology	3		
DRA 002	AutoCAD	4		
DRA 011	Introduction to Sketchup & Revit	3		
WELD 011	Shielded Metal Arc Welding	3		
WELD 012	Basic Gas Metal Arc Welding (MIG)	3		
	Required Subtotal	37		
	Approved Electives	3		
	COD General Education Pattern (p. 45)*	18		
	Kinesiology Activities	2		
	TOTAL CREDIT HOURS	**60**		

*Assumes that ESYS 004 – Industrial Calculations will be included in requirement

DRAFT

ONE-YEAR CERTIFICATE

ELECTRONICS TECHNOLOGY

The catalog in force is assigned to students based on the academic year they first applied to the college, and changes only when students change their major or request the change in writing.

1819 Catalog
Effective Fall 2019

Applied Engineering Division — *Applied Sciences Department*

TECHNICAL Course Number	Course Title	Credits	Pre- and Co-Requisites	Completed Sem./Year
AENG 009	Introduction to Robotics	2		
AENG 020	DC Circuit Analysis I	3		
AENG 021	DC Circuit Analysis II	3		
AENG 022	AC Circuit Analysis	4		
AENG 050	Digital Logic Analysis	3		
ESYS 095A	Work Experience	1-3		
	TOTAL CREDIT HOURS	**16-18**		

Engineering Technology

Desert/ Inland Empire Region (Riverside- San Bernardino-Ontario MSA)

Demand for Engineering Technology Occupations

Employment for the engineering technology occupational group is expected to increase by 11% through 2021 in the Inland Empire/ Desert Region. A total of nearly 14,500 job openings will be available over the five-year time frame.

Of the selected occupations, electricians had the most jobs in 2016 (7,326 jobs) and are expected to have the most job openings (5,223 total job openings) over the next five years. Electrical Power-Line Installers and Repairers is the fastest growing occupation in this group, increasing employment 19%, and is expecting to have more than 150 annual job openings over the next five years.

According to job ads, the top worksite regional cities for jobs in this occupational group were Riverside, Ontario, and Corona. The top employers were Edison International, City of Riverside, and Niagara Bottling Llc. The industry that employs the most engineering technology occupations in the two-county region is building equipment contractors.

Engineering Technology Occupations (SOC Code)	2016 Jobs	2021 Jobs	2016 - 2021 % Change (New Jobs)	2016 - 2021 Openings (New and Replacement Jobs)	Annual Openings (New and Replacement Jobs)	Age 55+ % of Occupation	Middle Skill Job?*
Electricians (47-2111)	7,326	8,350	14%	5,223	1,045	17%	Yes
Operating Engineers and Other Construction Equipment Operators (47-2073)	4,008	4,277	7%	2,505	501	26%	Yes
Industrial Machinery Mechanics (49-9041)	2,585	2,998	16%	1,581	316	28%	Yes
Electrical Power-Line Installers and Repairers (49-9051)	1,523	1,816	19%	941	188	15%	Yes
Telecommunications Line Installers and Repairers (49-9052)	1,284	1,488	16%	874	175	13%	Yes
Computer-Controlled	1,242	1,423	15%	824	165	20%	Yes

Engineering Technology Occupations (SOC Code)	2016 Jobs	2021 Jobs	2016 - 2021 % Change (New Jobs)	2016 - 2021 Openings (New and Replacement Jobs)	Annual Openings (New and Replacement Jobs)	Age 55+ % of Occupation	Middle Skill Job?*
Machine Tool Operators, Metal and Plastic (51-4011)							
Construction and Building Inspectors (47-4011)	1,163	1,245	7%	719	144	41%	Yes
Architectural and Civil Drafters (17-3011)	1,111	1,134	2%	495	99	25%	Yes
Electrical and Electronics Engineering Technicians (17-3023)	896	926	3%	416	83	27%	Yes
Electrical Engineers (17-2071)	609	672	10%	263	53	28%	No
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay (49-2095)	328	313	(5%)	85	28	19%	Yes
Electro-Mechanical Technicians (17-3024)	325	322	(1%)	140	28	26%	Yes
Industrial Engineering Technicians (17-3026)	305	323	6%	151	30	26%	Yes
Power Distributors and Dispatchers (51-8012)	218	208	(5%)	93	19	24%	Yes
Mechanical Engineering Technicians (17-3027)	127	139	9%	68	14	21%	Yes
TOTAL	**23,049**	**25,632**	**11%**	**14,430**	**2,886**	**22%**	

Source: EMSI 2017.4, COE
*Middle skill definition is found in Appendix A

Wages

Wages for engineering technology occupations are sorted by median earnings. The median wage and average annual earnings for each of the occupations in the engineering technology occupational group are above the MIT Living Wage estimate of $12.10 per hour or $25,172 annually for a single adult living in the Inland Empire/ Desert Region.

Engineering Technology Occupational Group	Hourly Earnings Range*	Median Wage*	Avg. Annual Earnings
Electrical Engineers	$26.53 to $62.52	$44.55	$92,800
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	$25.11 to $58.86	$39.45	$83,900
Construction and Building Inspectors	$23.11 to $59.12	$39.15	$82,500
Power Distributors and Dispatchers	$32.10 to $58.31	$37.94	$85,400
Electrical Power-Line Installers and Repairers	$17.87 to $59.55	$34.97	$78,500
Electrical and Electronics Engineering Technicians	$15.95 to $45.53	$31.03	$64,200
Electro-Mechanical Technicians	$24.60 to $46.30	$29.73	$69,000
Operating Engineers and Other Construction Equipment Operators	$16.94 to $48.06	$28.98	$66,200
Industrial Engineering Technicians	$15.62 to $44.86	$26.14	$58,800
Electricians	$15.29 to $41.78	$25.16	$55,400
Mechanical Engineering Technicians	$14.86 to $37.64	$25.12	$53,800
Architectural and Civil Drafters	$13.11 to $37.05	$24.15	$51,500
Telecommunications Line Installers and Repairers	$13.84 to $37.00	$23.48	$51,400
Industrial Machinery Mechanics	$16.84 to $36.35	$23.38	$52,000
Computer-Controlled Machine Tool Operators, Metal and Plastic	$10.82 to $28.79	$17.01	$38,300

Source: EMSI 2017.4

*Entry Hourly is 10th percentile wage, median is 50th percentile wage, experienced is 90th Percentile

Skills

The following table lists the top skills requested by employers from job postings across the full year 2017. The "n" represents the number of job postings available for each occupation or the number of times the skills was mentioned for each occupation during the timeframe.

Occupation	Top Skills in Job Postings (2017)
Electricians *(n=295)*	Electrical Work *(n=259)*, Repair *(n=220)*, Electrical Systems *(n=103)*
Electrical Engineers *(n=170)*	Electrical Engineering *(n=95)*, AutoCAD *(n=57)*, Programmable Logic Controller (PLC) Programming *(n=49)*
Industrial Machinery Mechanics *(n=163)*	Repair *(n=151)*, Machinery *(n=75)*, Programmable Logic Controller (PLC) Programming *(n=31)*
Electrical and Electronics Engineering Technicians *(n=131)*	Repair *(n=76)*, Test Equipment *(n=32)*, Schematic Diagrams *(n=26)*
Construction and Building Inspectors *(n=81)*	Inspection *(n=77)*, Construction Inspection *(n=22)*, Building Inspection *(n=17)*
Computer-Controlled Machine Tool Operators, Metal and Plastic *(n=33)*	Computer Numerical Control (CNC) *(n=33)*, Computerized Numerical Control Lathes *(n=12)*, Machine Operation *(n=12)*
Operating Engineers and Other Construction Equipment Operators *(n=30)*	Inspection *(n=20)*, Equipment Operation *(n=17)*, Operating Engineering *(n=10)*
Telecommunications Line Installers and Repairers *(n=21)*	Fiber Optics *(n=8)*, Test Equipment *(n=8)*, Machinery *(n=7)*
Architectural and Civil Drafters *(n=21)*	AutoCAD *(n=21)*, Autodesk *(n=8)*, Engineering Design *(n=7)*
Mechanical Engineering Technicians *(n=19)*	Repair *(n=18)*, Wiring *(n=5)*, Industrial Engineering Industry Expertise *(n=4)*
Electrical Power-Line Installers and Repairers *(n=18)*	Test Equipment *(n=8)*, Machinery *(n=6)*, Telecommunications *(n=6)*
Power Distributors and Dispatchers *(n=7)*	Repair *(n=5)*, Power Plant Operations *(n=4)*, Calibration *(n=3)*
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay *(n=3)*	Switches *(n=3)*, SCADA *(n=3)*, Circuit Breakers *(n=3)*
Electro-Mechanical Technicians *(n=3)*	Machinery *(n=3)*, Welding *(n=3)*, Repair *(n=3)*

Occupation	Top Skills in Job Postings (2017)
Industrial Engineering Technicians *(n=1)*	N/A

Source: Burning Glass – Labor Insights

Appendix A

Middle Skill Definition:

Note: Exceptions were made for those already categorized as such. An occupation only needed to meet one criteria.

1. All occupations listed as having some college or associate degree = Yes
2. All occupations needing an apprenticeship = Yes
3. All occupations with a Bachelor's degree with ~>= 33% of workers (CPS) having some college to associate degree = Yes
4. All occupations with high school or equivalent or no formal education with long-term OTJ = Yes
5. All supervisorial occupations (skills-builder qualified) = Yes
6. All occupations with high school or equivalent or no formal education with less than 5 years work experience = Yes
7. Exceptions for Bachelor's degree where there is pre-existing CCs level programs
8. Exceptions were made for occupations with high school or equivalent or no formal education with short or moderate OTJ where multiple CCs have pre-existing programs

For reference, the following table displays the lay job titles corresponding to the established standard occupational title and code as determined by O*Net
Online: https://www.onetonline.org/

Job Title	Corresponding Occupations from O*NET
CNC Operator	Computer-Controlled Machine Tool Operators, Metal and Plastic (51-4011)
Electrician I/II with utility company	Electricians (47-2111) Electrical and Electronics Repairers, Powerhouse, Substation, and Relay (49-2095)
Electronic Technician	Electrical and Electronic Engineering Technician (17-3023)
Electrical Engineering Technician	Electrical and Electronic Engineering Technician (17-3023)
PLC Controls Electrician	Electrical Engineers (17-2071)
Architectural and Civil Drafters	Architectural and Civil Drafters (17-3011)
Construction and Building Inspectors	Construction and Building Inspectors (47-4011)
Power Distributors and Dispatchers	Power Distributors and Dispatchers (51-8012)
Operating Engineers and Other Construction Equipment Operators	Operating Engineers and Other Construction Equipment Operators (47-2073)
Electrical Power-Line Installers and Repairers	Electrical Power-Line Installers and Repairers (49-9051)
Telecommunications Line Installers and Repairers	Telecommunications Line Installers and Repairers (49-9052)
Any manufacturing related jobs that include robotics or mechatronics	Electro-Mechanical Technicians (17-3024) Mechanical Engineering Technicians (17-3027) Industrial Engineering Technicians (17-3026) Industry Machinery Mechanics (49-9041)