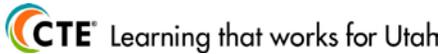


# Utah Career and Technical Education Career Pathway

## 2017-2018 School Year



**CTSO Information**  
 Career and Technical Student Organizations (CTSO) align with the national Career Clusters® and the Utah CTE Career Pathways.  
 TSA is the CTSO for students in the CAD Mechanical Design Career Pathway. TSA fosters personal growth, leadership, and opportunities in science, technology, engineering, and mathematics (STEM).

**Workforce Trends**  
 Industrial growth and increasingly complex designs will spur growth in drafting services. As technology advances, opportunities will be best for drafters with at least 2 years of postsecondary training, and computer-aided design systems experience.

### Career Cluster: Engineering & Technology

#### Career Pathway: CAD Mechanical Design

CORE CODE	FOUNDATION COURSES (required)	CREDITS	
38.01.00.00.051	CAD Mechanical Design 1 *	.50	1.50-2.00 credits
38.01.00.00.052	CAD Mechanical Design 2	.50	
38.01.00.00.053	CAD Mechanical Design 3	.50	
<b>Or choose the following courses:</b>			
38.01.00.00.300	PLTW Introduction to Engineering Design	1.00	1.00-1.50 credits
38.01.00.00.310	PLTW Principles of Engineering	1.00	
ELECTIVE COURSES			
38.03.00.00.010	Engineering Technology	.50	1.00-1.50 credits
40.13.00.00.030	Industrial Design *	1.00	
40.10.00.00.072	Machining 1 *	.50	
40.10.00.00.070	Machining 2 *	.50	
38.01.00.00.011	Manufacturing Principles 1	.50	
38.01.00.00.012	Manufacturing Principles 2	.50	
38.01.00.00.211	Physics with Technology	1.00	
40.10.00.00.110	Welding Technician, Entry Level *	.50	
41.00.00.00.030	Workplace Skills	.50	
		<b>3.00 credits for completion</b>	

\* Course can be taken up to 1.00 credit.  
 Foundation courses taken beyond the required credits can be used as elective credit.

**Career and Technical Education provides all students access to high-quality, rigorous career-focused programs that result in attainment of credentials with labor market value.**

**CAD Mechanical Design is:**  
 > High skill  
 > High wage

**Sample Occupations Requiring:**  
[High School Diploma](#)  
 > N/A  
**Certificate**  
 > N/A  
**Assoc. or Technical Degree**  
 > Engineering Technician  
 > Mechanical Drafter  
 > Mechanical Engineering Technician  
**Baccalaureate Degree**  
 > Aerospace Engineer  
 > Career and Technical Education Teacher  
 > Civil Engineer  
 > Industrial Designer  
 > Mechanical Engineer  
 > Secondary Education Teacher  
**Graduate or Prof. Degree**  
 > Mechanical Engineer

**Student Testimonial**  
 "My training, in CTE courses in high school, prepared me for life after high school by helping me discover my love of drafting. I discovered the need for drafters in the world of engineering. I focused my CTE Pathway toward this career goal, and have taken some advanced drafting classes to improve both my knowledge of the field and my employability in the field."  
 Calvin Hill

### HIGH SCHOOL TO POSTSECONDARY EDUCATION AND TRAINING

There are a number of options for education and training beyond high school, depending on your career goals.

12th Grade	1-Year Certificate	2-Year Associate or Technical Degree	4-Year Bachelor's Degree	More Graduate or Prof. Degree
Certificates are awarded upon the successful completion of a brief course of study, usually one year or less. Upon completion of a course of study, a certificate does not require any further action to retain. In high school a variety of certificates can be earned.		An academic degree is an award for the completion of a program or course of study over multiple years at postsecondary education institutions. In 2015-2016, 73 percent of secondary students who concentrated in a CTE Career Pathway placed in postsecondary education, advanced training, military service or employment (October 1-December 31).		

**Utah Business and Industry Facts**  
 According to the Utah Department of Workforce Services, 620 mechanical drafters are employed by more than 3,000 businesses throughout the state.  
 The annual median salary for an experienced mechanical drafter is \$51,690.

**CTE Skill Certificates**  
 Competency-based student assessments, measured by core standards and competencies needed to be successful in the workforce.

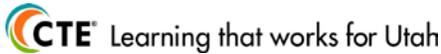
**UtahFutures: College and Career Planning**  
 Visit [UtahFutures.org](http://UtahFutures.org) for salary projections, labor market demand, and training options.

In 2015-2016, 96,190 CTE skill certificates were awarded to high school students. Students' knowledge and performance is demonstrated as part of the Skill Certificate process.

In 2015-2016, the graduation rate for students who concentrated in a CTE Career Pathway was 96.6 percent, compared to Utah's statewide graduation rate of 85 percent.

# Utah Career and Technical Education Career Pathway

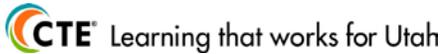
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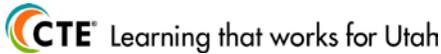
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TSA fosters personal growth, leadership, and opportunities in science, technology, engineering, and mathematics (STEM).</p> <p><b>Workforce Trends</b> Due to the expansion of jobs in the technical fields and the increasing number of engineers who are retiring, the number of job openings in technology and engineering are increasing.</p> <p>According to the U.S. Bureau of Labor Statistics, 13 percent of U.S. engineering jobs are held by women, with one in four jobs in technology, engineering, and mathematics.</p>	<h3 style="margin: 0;">Career Cluster: Engineering &amp; Technology</h3> <h3 style="margin: 0;">Career Pathway: Mechanical Engineering</h3> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr style="background-color: #00a6c9; color: white;"> <th style="width: 15%;">CORE CODE</th> <th style="width: 55%;">FOUNDATION COURSES (required)</th> <th style="width: 15%;">CREDITS</th> <th style="width: 15%;"></th> </tr> </thead> <tbody> <tr style="background-color: #e0f2f1;"> <td colspan="4"><b>CAD Component</b></td> </tr> <tr> <td>38.01.00.00.051</td> <td>CAD Mechanical Design 1 *</td> <td>.50</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">1.00 credit</td> </tr> <tr> <td>38.01.00.00.052</td> <td>CAD Mechanical Design 2</td> <td>.50</td> </tr> <tr> <td colspan="4" style="text-align: center;"><i>Or choose the following course:</i></td> </tr> <tr> <td>38.01.00.00.300</td> <td>PLTW Introduction to Engineering Design</td> <td>1.00</td> <td></td> </tr> <tr style="background-color: #e0f2f1;"> <td colspan="4"><b>Foundation Component</b></td> </tr> <tr> <td>38.01.00.00.151</td> <td>Engineering Principles 1</td> <td>.50</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">1.00 credit</td> </tr> <tr> <td>38.01.00.00.152</td> <td>Engineering Principles 2</td> <td>.50</td> </tr> <tr> <td colspan="4" style="text-align: center;"><i>Or choose the following course:</i></td> </tr> <tr> <td>38.01.00.00.152</td> <td>PLTW Principles of Engineering</td> <td>1.00</td> <td></td> </tr> <tr style="background-color: #e0f2f1;"> <td colspan="4"><b>Capstone Component</b></td> </tr> <tr> <td>38.01.00.00.990</td> <td>Engineering Capstone</td> <td>1.00</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">1.00 credit</td> </tr> <tr> <td colspan="4" style="text-align: center;"><i>Or choose the following course:</i></td> </tr> <tr> <td>38.01.00.00.390</td> <td>PLTW Engineering Design and Development</td> <td>1.00</td> <td></td> </tr> <tr style="background-color: #00a6c9; color: white;"> <td colspan="4" style="text-align: center;"><b>ELECTIVE COURSES</b></td> </tr> <tr> <td>38.03.00.00.010</td> <td>Engineering Technology</td> <td>.50</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">3.00 credits for completion</td> </tr> <tr> <td>38.01.00.00.211</td> <td>Physics with Technology</td> <td>1.00</td> </tr> <tr> <td>41.00.00.00.030</td> <td>Workplace Skills</td> <td>.50</td> </tr> </tbody> </table> <p style="font-size: small; margin-top: 5px;">* Course can be taken up to 1.00 credit. 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<p><b>Student Testimonial</b></p> <p>"I have always liked doing hands-on projects and thinking of different ways to make something better. With the CTE classes I was able to see whole processes, from the design stage on paper to transferring that design and idea into a computer application, then all the way to building a prototype."</p> <p style="text-align: right; font-size: small;">Hunter Okerlund</p>	<h3 style="margin: 0;">HIGH SCHOOL TO POSTSECONDARY EDUCATION AND TRAINING</h3> <p style="margin: 0;">There are a number of options for education and training beyond high school, depending on your career goals.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <td style="width: 15%; background-color: #00a6c9; color: white; text-align: center; padding: 5px;"><b>12th Grade</b></td> <td style="width: 15%; background-color: #ff9800; color: white; text-align: center; padding: 5px;"><b>1-Year Certificate</b></td> <td style="width: 15%; background-color: #8bc34a; color: white; text-align: center; padding: 5px;"><b>2-Year Associate or Technical Degree</b></td> <td style="width: 15%; background-color: #ffc107; color: white; text-align: center; padding: 5px;"><b>4-Year Bachelor's Degree</b></td> <td style="width: 15%; background-color: #607d8b; color: white; text-align: center; padding: 5px;"><b>More Graduate or Prof. Degree</b></td> </tr> </table> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; padding: 5px;"> <p>Certificates are awarded upon the successful completion of a brief course of study, usually one year or less. Upon completion of a course of study, a certificate does not require any further action to retain.</p> <p>In high school a variety of certificates can be earned.</p> </div> <div style="width: 45%; padding: 5px;"> <p>An academic degree is an award for the completion of a program or course of study over multiple years at postsecondary education institutions.</p> <p>In 2015-2016, 73 percent of secondary students who concentrated in a CTE Career Pathway placed in postsecondary education, advanced training, military service or employment (October 1-December 31).</p> </div> </div>	<b>12th Grade</b>	<b>1-Year Certificate</b>	<b>2-Year Associate or Technical Degree</b>	<b>4-Year Bachelor's Degree</b>	<b>More Graduate or Prof. Degree</b>	<p><b>Utah Business and Industry Facts</b></p> <p style="font-size: small;">The Engineering Initiative, established by the Utah State Legislature in 2001, aimed to triple engineering and computer science graduates. Since 2015, Utah state schools graduated 907 engineering and computer science students per year, 657 more than promised.</p> <p style="font-size: small;">According to Richard Brown, Dean of Engineering at the University of Utah, Utah's gross domestic product has more than doubled since the Engineering Initiative started.</p>																																																																			
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# Utah Career and Technical Education Career Pathway

## 2017-2018 School Year



<p><b>CTSO Information</b> Career and Technical Student Organizations (CTSO) align with the national Career Clusters® and the Utah CTE Career Pathways.</p> <p>TSA is the CTSSO for students in the Robotics Career Pathway. TSA fosters personal growth, leadership, and opportunities in science, technology, engineering, and mathematics (STEM).</p> <p><b>Workforce Trends</b> Most robotics engineers are employed by private companies and work in laboratory or production settings.</p>	<h3 style="margin: 0;">Career Cluster: Engineering &amp; Technology</h3> <h3 style="margin: 0;">Career Pathway: Robotics</h3> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr style="background-color: #009999; color: white;"> <th style="text-align: left;">CORE CODE</th> <th style="text-align: left;">FOUNDATION COURSES (required)</th> <th style="text-align: center;">CREDITS</th> <th></th> </tr> </thead> <tbody> <tr> <td>38.01.00.00.031</td> <td>Robotics 1</td> <td style="text-align: center;">.50</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">1.00 credit</td> </tr> <tr> <td>38.01.00.00.032</td> <td>Robotics 2</td> <td style="text-align: center;">.50</td> </tr> <tr style="background-color: #009999; color: white;"> <th colspan="4" style="text-align: center;">ELECTIVE COURSES</th> </tr> <tr> <td>38.01.00.00.041</td> <td>CAD Architectural Design 1 *</td> <td style="text-align: center;">.50</td> <td rowspan="14" style="text-align: center; vertical-align: middle;">2.00 credits</td> </tr> <tr> <td>38.01.00.00.051</td> <td>CAD Mechanical Design 1 *</td> <td style="text-align: center;">.50</td> </tr> <tr> <td>35.02.00.00.030</td> <td>Computer Programming 1</td> <td style="text-align: center;">1.00</td> </tr> <tr> <td>40.08.00.00.050</td> <td>Electrician 1</td> <td style="text-align: center;">1.00</td> </tr> <tr> <td>38.01.00.00.021</td> <td>Electronics 1 *</td> <td style="text-align: center;">.50</td> </tr> <tr> <td>40.09.00.00.070</td> <td>Industrial Maintenance Technician</td> <td style="text-align: center;">1.00</td> </tr> <tr> <td>40.10.00.00.072</td> <td>Machining 1 *</td> <td style="text-align: center;">1.00</td> </tr> <tr> <td>38.01.00.00.011</td> <td>Manufacturing Principles 1</td> <td style="text-align: center;">.50</td> </tr> <tr> <td>38.01.00.00.012</td> <td>Manufacturing Principles 2</td> <td style="text-align: center;">.50</td> </tr> <tr> <td>40.11.00.00.100</td> <td>Materials Handling</td> <td style="text-align: center;">1.00</td> </tr> <tr> <td>38.01.00.00.211</td> <td>Physics with Technology</td> <td style="text-align: center;">.50</td> </tr> <tr> <td>38.01.00.00.320</td> <td>PLTW Digital Electronics</td> <td style="text-align: center;">1.00</td> </tr> <tr> <td>41.00.00.00.030</td> <td>Workplace Skills</td> <td style="text-align: center;">.50</td> </tr> <tr> <td colspan="4" style="text-align: center; background-color: #333; color: white; padding: 5px;"><b>3.00 credits for completion</b></td> </tr> </tbody> </table> <p style="text-align: center; font-weight: bold; margin-top: 10px;">Career and Technical Education provides all students access to high-quality, rigorous career-focused programs that result in attainment of credentials with labor market value.</p>	CORE CODE	FOUNDATION COURSES (required)	CREDITS		38.01.00.00.031	Robotics 1	.50	1.00 credit	38.01.00.00.032	Robotics 2	.50	ELECTIVE COURSES				38.01.00.00.041	CAD Architectural Design 1 *	.50	2.00 credits	38.01.00.00.051	CAD Mechanical Design 1 *	.50	35.02.00.00.030	Computer Programming 1	1.00	40.08.00.00.050	Electrician 1	1.00	38.01.00.00.021	Electronics 1 *	.50	40.09.00.00.070	Industrial Maintenance Technician	1.00	40.10.00.00.072	Machining 1 *	1.00	38.01.00.00.011	Manufacturing Principles 1	.50	38.01.00.00.012	Manufacturing Principles 2	.50	40.11.00.00.100	Materials Handling	1.00	38.01.00.00.211	Physics with Technology	.50	38.01.00.00.320	PLTW Digital Electronics	1.00	41.00.00.00.030	Workplace Skills	.50	<b>3.00 credits for completion</b>				<p><b>Robotics is:</b> &gt; High skill &gt; High wage</p> <p><b>Sample Occupations Requiring:</b> <a href="#">High School Diploma</a> &gt; N/A <a href="#">Certificate</a> &gt; N/A <a href="#">Assoc. or Technical Degree</a> &gt; Electro-Mechanical Technicians <a href="#">Baccalaureate Degree</a> &gt; Automation Engineer &gt; Career and Technical Education Teacher &gt; Engineer &gt; Industrial Engineer &gt; Robotics Engineer <a href="#">Graduate or Prof. Degree</a> &gt; Engineer</p>
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<p><b>Student Testimonial</b> “I want to earn an AAS degree in mechatronics. After completing my degree I plan on finding work with a company designing production equipment. My high school engineering instructor was an amazing person and has influenced my love of this field and the path that I have chosen.”  Connor Hendry</p>	<h3 style="margin: 0;">HIGH SCHOOL TO POSTSECONDARY EDUCATION AND TRAINING</h3> <p style="margin: 0;">There are a number of options for education and training beyond high school, depending on your career goals.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="background-color: #009999; color: white; text-align: center;">12th Grade</th> <th style="background-color: #ff6600; color: white; text-align: center;">1-Year Certificate</th> <th style="background-color: #99cc33; color: white; text-align: center;">2-Year Associate or Technical Degree</th> <th style="background-color: #ffcc00; color: white; text-align: center;">4-Year Bachelor's Degree</th> <th style="background-color: #666666; color: white; text-align: center;">More Graduate or Prof. Degree</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"> <p>Certificates are awarded upon the successful completion of a brief course of study, usually one year or less. Upon completion of a course of study, a certificate does not require any further action to retain.</p> <p>In high school a variety of certificates can be earned.</p> </td> <td colspan="3" style="padding: 5px;"> <p>An academic degree is an award for the completion of a program or course of study over multiple years at postsecondary education institutions.</p> <p>In 2015-2016, 73 percent of secondary students who concentrated in a CTE Career Pathway placed in postsecondary education, advanced training, military service or employment (October 1-December 31).</p> </td> <td style="padding: 5px;"> <p>From “smart” shoes to flying robots to self-driving cars, throughout Utah there are hundreds of companies that use robotics to streamline the manufacturing process, produce goods, and make daily tasks easier.</p> <p>“We have this idea that robots will help us in the future,” said Mark Minor, associate professor, University of Utah. “Well, the future is here. You just have to understand what they’re doing.” <i>(Deseret News, March 9, 2015)</i></p> </td> </tr> </tbody> </table>	12th Grade	1-Year Certificate	2-Year Associate or Technical Degree	4-Year Bachelor's Degree	More Graduate or Prof. Degree	<p>Certificates are awarded upon the successful completion of a brief course of study, usually one year or less. Upon completion of a course of study, a certificate does not require any further action to retain.</p> <p>In high school a variety of certificates can be earned.</p>	<p>An academic degree is an award for the completion of a program or course of study over multiple years at postsecondary education institutions.</p> <p>In 2015-2016, 73 percent of secondary students who concentrated in a CTE Career Pathway placed in postsecondary education, advanced training, military service or employment (October 1-December 31).</p>			<p>From “smart” shoes to flying robots to self-driving cars, throughout Utah there are hundreds of companies that use robotics to streamline the manufacturing process, produce goods, and make daily tasks easier.</p> <p>“We have this idea that robots will help us in the future,” said Mark Minor, associate professor, University of Utah. “Well, the future is here. You just have to understand what they’re doing.” <i>(Deseret News, March 9, 2015)</i></p>	<p><b>Utah Business and Industry Facts</b></p>																																																	
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