



High School to College and Career Pathway: Secondary Career and Technical Education

Area of Study: Technology and Engineering Education

Pathway: Architectural Design (CAD/Drafting)

Get the Facts

Rising energy costs and increased concern about the environment have led to many new buildings being built with more sustainable designs. Therefore, demand for architects with knowledge of green design/sustainable design are particularly in demand.

A drafter is a nontraditional occupation for women. In 2012, 16.6 percent of the people employed in this occupation were women.

Workforce Trends

Nationwide, employment of architects is projected to grow 17 percent through the year 2022. In Utah, the average hourly median wage is \$35.80.

CAREER AND TECHNICAL EDUCATION Recommended Pathway Courses

(Students may select individual courses for exploration, or a complete Pathway for an in-depth focus.)

CLASS AVAILABILITY MAY VARY AT YOUR HIGH SCHOOL

Course #	Foundation Courses: (required)	Credit
15.1341	CAD Architectural Design 1	.50
15.1342	CAD Architectural Design 2	.50
15.1343	CAD Architectural Design 3	.50
Or choose the following courses:		
14.1330	PLTW Civil Engineering & Architecture	1.00
14.1300	PLTW Introduction to Engineering Design	1.00
Elective Courses		
48.0703	Cabinetmaking	1.00
46.0201	Carpentry 1	1.00
46.0000	Construction Trades Foundation	.50
46.0302	Electrician 1	.50
15.1510	Engineering Technology	.50
47.0705	GIS Remote Sensing	.50
47.0201	HVAC	1.00
20.0110	Interior Design 1	.50
47.0702	Introduction to Geographical Information Systems (GIS)	.50
14.1211	Physics with Technology	1.00
46.0501	Plumbing 1	1.00
32.0199	Workplace Skills	.50

1.50-2.00 credits

1.00-1.50 credits

3.00 credits for completion

Architectural Design (CAD/Drafting) is:

- > High skill
- > High wage
- > High demand

Sample Career Occupations

- > Architectural Drafter
- > Civil Engineer
- > Drafting/CAD Teacher
- > Industrial Designer
- > Interior Designer
- > Landscape Designer

Foundation courses taken beyond the required credits can be used as elective credit.

Middle School		State Requirements		High School Suggested Education Plan				College and Career
7th Grade	8th Grade	Middle School	High School	9th Grade Suggested	10th Grade Suggested	11th Grade Suggested	12th Grade Suggested	Beyond High School
Language Arts 7 1.00	Language Arts 8 1.00	2.00	Language Arts 4.00	Language Arts 9 1.00	Language Arts 10 1.00	Language Arts 11 1.00	Language Arts 12 1.00	<p>There are a number of options for education and training beyond high school, depending on your career goals.</p> <ul style="list-style-type: none"> > Certificate > Associate degree > Bachelor's degree > Professional degree > On-the-job training > Apprenticeship > Military training <p>For more information on salary projections, labor market demand, and training options, visit UtahFutures.org.</p>
Math * 1.00	Math * 1.00	2.00	Math 3.00	Math * 1.00	Math * 1.00	Math * 1.00	Math * 1.00	
Science .50	Science 1.00	1.50	Science 3.00	Earth Systems 1.00	Physics or Physics with Technology 1.00	Chemistry 1.00	Biology 1.00	
Utah Studies .50	U.S. History I 1.00	1.50	Social Studies 3.00	Geography for Life .50	World Civilizations .50	U.S. History II 1.00	U.S. Government and Citizenship .50	
P.E. 1.00	Health .50	1.50	P.E./Health 2.00	Participation Skills and Techniques .50	Fitness for Life .50 / Health Education .50 Lifetime Activities or Sport .50			
The Arts .50	The Arts .50	1.00	Fine Arts 1.50	Fine Arts Courses 1.50				
Keyboarding .50			Digital Literacy .50	Comp. Tech. or Exploring Computer Science .50				
College & Career Awareness 1.00	Exploring Technology .50	1.00	CTE 1.00	Refer to Career and Technical Education box above.				

> * Talk to your school counselor about math requirements in the core curriculum. Core curriculum and elective requirements may vary district to district.
 > Many CTE courses may qualify for concurrent enrollment credit, which in some cases may earn up to 1.0 credit toward Pathway completion. Talk to your school counselor about availability.

> Concurrent enrollment course offerings vary by school and district.
 > Many Utah postsecondary programs accept high school courses toward a two- or four-year degree through concurrent enrollment. Check regional postsecondary Pathways for details.



High School to College and Career Pathway: Secondary Career and Technical Education

Area of Study: Technology and Engineering Education

Pathway: Electronics

Get the Facts

A typical American household owns 24 electronic products, spending over \$1,380 per year on such devices.

In 2013, 8.3 percent of the people employed as electrical engineers or electronic engineers were women.

Workforce Trends

Employment will be limited by computer-aided design and other technologies that increase productivity. Opportunities will be best for those who have an associate degree or extensive job training.

CAREER AND TECHNICAL EDUCATION Recommended Pathway Courses

(Students may select individual courses for exploration, or a complete Pathway for an in-depth focus.)

CLASS AVAILABILITY MAY VARY AT YOUR HIGH SCHOOL

Course #	Foundation Courses: (required)	Credit
15.0321	Electronics 1	.50
15.0322	Electronics 2	.50
15.0323	Electronics 3	.50
Or choose the following courses:		
14.1320	PLTW Digital Electronics	1.00
14.1300	PLTW Introduction to Engineering Design	1.00
Elective Courses		
47.0654	ASE Electrical/Electronics *	.50
15.1341	CAD Architectural Design 1	.50
15.1351	CAD Mechanical Design 1	.50
46.0302	Electrician 1	.50
15.1510	Engineering Technology	.50
47.0604	Introduction to Automotive *	.50
14.1211	Physics with Technology	1.00
14.1310	PLTW Principles of Engineering	1.00
10.0205	Radio Broadcasting 1 *	.50
10.0203	Video Production 1 *	.50
32.0199	Workplace Skills	.50

1.50-2.00 credits

1.00-1.50 credits

* Course can be taken up to 1.00 credit.

Foundation courses taken beyond the required credits can be used as elective credit.

3.00 credits for completion

Electronics is:

- > High skill
- > High wage
- > High demand

Sample Career Occupations

- > Electronics Drafter
- > Electronics Engineer
- > Electronics Equipment Assembler
- > Electronics Installer Repairer
- > Electronics Teacher

Middle School		State Requirements		High School Suggested Education Plan				College and Career
7th Grade	8th Grade	Middle School	High School	9th Grade Suggested	10th Grade Suggested	11th Grade Suggested	12th Grade Suggested	Beyond High School
Language Arts 7 1.00	Language Arts 8 1.00	2.00	Language Arts 4.00	Language Arts 9 1.00	Language Arts 10 1.00	Language Arts 11 1.00	Language Arts 12 1.00	<p>There are a number of options for education and training beyond high school, depending on your career goals.</p> <ul style="list-style-type: none"> > Certificate > Associate degree > Bachelor's degree > Professional degree > On-the-job training > Apprenticeship > Military training <p>For more information on salary projections, labor market demand, and training options, visit UtahFutures.org.</p>
Math * 1.00	Math * 1.00	2.00	Math 3.00	Math * 1.00	Math * 1.00	Math * 1.00	Math * 1.00	
Science .50	Science 1.00	1.50	Science 3.00	Earth Systems 1.00	Physics or Physics with Technology 1.00	Chemistry 1.00	Biology 1.00	
Utah Studies .50	U.S. History I 1.00	1.50	Social Studies 3.00	Geography for Life .50	World Civilizations .50	U.S. History II 1.00	U.S. Government and Citizenship .50	
P.E. 1.00	Health .50	1.50	P.E./Health 2.00	Participation Skills and Techniques .50	Fitness for Life .50 / Health Education .50 Lifetime Activities or Sport .50		General Financial Literacy .50	
The Arts .50	The Arts .50	1.00	Fine Arts 1.50	Fine Arts Courses 1.50				
Keyboarding .50			Digital Literacy .50	Comp. Tech. or Exploring Computer Science .50				
College & Career Awareness 1.00	Exploring Technology .50	1.00	CTE 1.00	Refer to Career and Technical Education box above.				

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High School to College and Career Pathway: Secondary Career and Technical Education

Area of Study: Technology and Engineering Education

Pathway: Engineering

Get the Facts

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.

Twenty percent of engineering undergraduate are women and 10 percent of the engineering workforce is female.

Workforce Trends

According to the Utah Department of Workforce Services, the annual growth rate of engineers is projected to increase 2.2 percent by the year 2022.

CAREER AND TECHNICAL EDUCATION Recommended Pathway Courses

(Students may select individual courses for exploration, or a complete Pathway for an in-depth focus.)

CLASS AVAILABILITY MAY VARY AT YOUR HIGH SCHOOL

Course #	Foundation Courses: (required)	Credit
CAD/Drafting Component		
15.1351	CAD Mechanical Design 1	.50
15.1352	CAD Mechanical Design 2	.50
<i>Or choose the following course:</i>		
14.1300	PLTW Introduction to Engineering Design	1.00
Design Component		
14.1551	Engineering Principles 1	.50
14.1552	Engineering Principles 2	.50
<i>Or choose the following course:</i>		
14.1310	PLTW Principles of Engineering	1.00
Elective Courses		
15.1353	CAD Mechanical Design 3	.50
15.0321	Electronics 1	.50
15.0322	Electronics 2	.50
14.9990	Engineering Capstone	1.00
45.0702	Introduction to Geographic Information Systems (GIS)	.50
14.1350	PLTW Aerospace Engineering	1.00
14.1330	PLTW Civil Engineering & Architecture	1.00
14.1340	PLTW Computer Integrated Manufacturing	1.00
14.1320	PLTW Digital Electronics	1.00
14.1390	PLTW Engineering Design & Development	1.00
14.4231	Robotics 1	.50
14.4232	Robotics 2	.50
32.0199	Workplace Skills	.50

1.00 credit

1.00 credit

1.00 credit

3.00 credits for completion

Engineering is:

- > High skill
- > High wage
- > High demand

Sample Career Occupations

- > Agricultural Engineer
- > Aeronautical Engineer
- > Biomedical Engineer
- > Civil Engineer
- > Electrical Engineer
- > Engineering Technician
- > Environmental Engineer
- > Mechanical Engineer
- > Product Design Engineer
- > Structural Engineer
- > Technology and Engineering Education Teacher

Foundation courses taken beyond the required credits can be used as elective credit.

Middle School		State Requirements		High School Suggested Education Plan				College and Career
7th Grade	8th Grade	Middle School	High School	9th Grade Suggested	10th Grade Suggested	11th Grade Suggested	12th Grade Suggested	Beyond High School
Language Arts 7 1.00	Language Arts 8 1.00	2.00	Language Arts 4.00	Language Arts 9 1.00	Language Arts 10 1.00	Language Arts 11 1.00	Language Arts 12 1.00	There are a number of options for education and training beyond high school, depending on your career goals. <ul style="list-style-type: none"> > Certificate > Associate degree > Bachelor's degree > Professional degree > On-the-job training > Apprenticeship > Military training For more information on salary projections, labor market demand, and training options, visit UtahFutures.org .
Math * 1.00	Math * 1.00	2.00	Math 3.00	Math * 1.00	Math * 1.00	Math * 1.00	Math * 1.00	
Science .50	Science 1.00	1.50	Science 3.00	Physics with Technology 1.00	Biology 1.00	Chemistry 1.00	Electronics 1.00	
Utah Studies .50	U.S. History I 1.00	1.50	Social Studies 3.00	Geography for Life .50	World Civilizations .50	U.S. History II 1.00	U.S. Government and Citizenship .50	
P.E. 1.00	Health .50	1.50	General Financial Literacy .50			General Financial Literacy .50		
P.E./Health 2.00			P.E./Health 2.00	Participation Skills and Techniques .50	Fitness for Life .50 / Health Education .50 Lifetime Activities or Sport .50			
The Arts .50	The Arts .50	1.00	Fine Arts 1.50	Fine Arts Courses 1.50				
Keyboarding .50			Digital Literacy .50	Comp. Tech. or Exploring Computer Science .50				
College & Career Awareness 1.00	Exploring Technology .50	1.00	CTE 1.00	Engineering Technology .50	Refer to Career and Technical Education box above.			

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High School to College and Career Pathway: Secondary Career and Technical Education

Area of Study: Technology and Engineering Education

Pathway: Mechanical Design (CAD/Drafting)

Get the Facts

In today's technologically advanced business world, drafters must have excellent drawing and graphic skills along with a high level of computer skills.

In 2013, 21.2 percent of the people employed as drafters were women.

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 AND TECHNICAL EDUCATION Recommended Pathway Courses

(Students may select individual courses for exploration, or a complete Pathway for an in-depth focus.)

CLASS AVAILABILITY MAY VARY AT YOUR HIGH SCHOOL

Course #	Foundation Courses: (required)	Credit
Mechanical Design Engineering track		
15.1351	CAD Mechanical Design 1	.50
15.1352	CAD Mechanical Design 2	.50
15.1353	CAD Mechanical Design 3	.50
Or choose the following courses:		
14.1300	PLTW Introduction to Engineering Design	1.00
14.1310	PLTW Principles of Engineering	1.00
Elective Courses		
15.1510	Engineering Technology	.50
50.0404	Industrial Design	1.00
48.0501	Machining 1 *	.50
48.0503	Machining 2 *	.50
14.3611	Manufacturing Principles 1	.50
14.3612	Manufacturing Principles 2	.50
14.1211	Physics with Technology	1.00
48.0508	Welding Technician – Entry Level *	.50
32.0199	Workplace Skills	.50

1.50-2.00 credits

1.00-1.50 credits

3.00 credits for completion

Mechanical Design (CAD/Drafting) is:

- > High skill
- > High wage
- > High demand

Sample Career Occupations

- > Aeronautical Designer
- > Civil Engineer
- > Drafting/CAD Teacher
- > Industrial Designer
- > Mechanical Designer
- > Mechanical Drafter

* Course can be taken up to 1.00 credit.

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Middle School		State Requirements		High School Suggested Education Plan				College and Career
7th Grade	8th Grade	Middle School	High School	9th Grade Suggested	10th Grade Suggested	11th Grade Suggested	12th Grade Suggested	Beyond High School
Language Arts 7 1.00	Language Arts 8 1.00	2.00	Language Arts 4.00	Language Arts 9 1.00	Language Arts 10 1.00	Language Arts 11 1.00	Language Arts 12 1.00	<p>There are a number of options for education and training beyond high school, depending on your career goals.</p> <ul style="list-style-type: none"> > Certificate > Associate degree > Bachelor's degree > Professional degree > On-the-job training > Apprenticeship > Military training <p>For more information on salary projections, labor market demand, and training options, visit UtahFutures.org.</p>
Math * 1.00	Math * 1.00	2.00	Math 3.00	Math * 1.00	Math * 1.00	Math * 1.00	Math * 1.00	
Science .50	Science 1.00	1.50	Science 3.00	Earth Systems 1.00	Physics or Physics with Technology 1.00	Chemistry 1.00	Biology 1.00	
Utah Studies .50	U.S. History I 1.00	1.50	Social Studies 3.00	Geography for Life .50	World Civilizations .50	U.S. History II 1.00	U.S. Government and Citizenship .50	
			General Financial Literacy .50			General Financial Literacy .50		
P.E. 1.00	Health .50	1.50	P.E./Health 2.00	Participation Skills and Techniques .50	Fitness for Life .50 / Health Education .50 Lifetime Activities or Sport .50			
The Arts .50	The Arts .50	1.00	Fine Arts 1.50	Fine Arts Courses 1.50				
Keyboarding .50			Digital Literacy .50	Comp. Tech. or Exploring Computer Science .50				
College & Career Awareness 1.00	Exploring Technology .50	1.00	CTE 1.00	Refer to Career and Technical Education box above.				

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High School to College and Career Pathway: Secondary Career and Technical Education

Area of Study: Technology and Engineering Education

Pathway: Robotics

Get the Facts

A robotics engineer designs robots and develops the programs and applications that allow them to function.

A robotics engineer is responsible for creating robotics and robotic systems that are able to perform a variety of tasks.

Through their creations, a robotics engineer helps to make jobs safer, easier, and more efficient. Robots are used in assembling vehicles, packaging food, and building appliances and electronic devices.

Workforce Trends
Most robotics engineers are employed by private companies and work in laboratory settings.

**CAREER AND TECHNICAL EDUCATION
Recommended Pathway Courses**

(Students may select individual courses for exploration, or a complete Pathway for an in-depth focus.)

CLASS AVAILABILITY MAY VARY AT YOUR HIGH SCHOOL

Course #	Foundation Courses: (required)	Credit
14.4231	Robotics 1	.50
14.4232	Robotics 2	.50
Elective Courses		
15.1341	CAD Architectural Design 1	.50
15.1351	CAD Mechanical Design 1	.50
11.0201	Computer Programming 1	1.00
46.0302	Electrician 1	1.00
15.0321	Electronics 1	.50
47.0303	Industrial Maintenance Technician	1.00
48.0503	Machinist Technician/CNC	1.00
14.3611	Manufacturing Principles 1	.50
14.3612	Manufacturing Principles 2	.50
49.9999	Material Handling	1.00
14.1211	Physics with Technology	1.00
14.1320	PLTW Digital Electronics	1.00
32.0199	Workplace Skills	.50

1.00 credit

2.00 credits

3.00 credits for completion

Robotics is:

- > High skill
- > High wage
- > High demand

Sample Career Occupations

- > Automation Developer
- > Lead Quality Assurance Engineer
- > Robotics Engineer
- > Sr. Automation Engineer
- > Test Automation Engineer

Middle School		State Requirements		High School Suggested Education Plan				College and Career
7th Grade	8th Grade	Middle School	High School	9th Grade Suggested	10th Grade Suggested	11th Grade Suggested	12th Grade Suggested	Beyond High School
Language Arts 7 1.00	Language Arts 8 1.00	2.00	Language Arts 4.00	Language Arts 9 1.00	Language Arts 10 1.00	Language Arts 11 1.00	Language Arts 12 1.00	<p>There are a number of options for education and training beyond high school, depending on your career goals.</p> <ul style="list-style-type: none"> > Certificate > Associate degree > Bachelor's degree > Professional degree > On-the-job training > Apprenticeship > Military training <p>For more information on salary projections, labor market demand, and training options, visit UtahFutures.org.</p>
Math * 1.00	Math * 1.00	2.00	Math 3.00	Math * 1.00	Math * 1.00	Math * 1.00	Math * 1.00	
Science .50	Science 1.00	1.50	Science 3.00	Earth Systems 1.00	Physics or Physics with Technology 1.00	Biology or Chemistry 1.00	Electronics 1.00	
Utah Studies .50	U.S. History I 1.00	1.50	Social Studies 3.00	Geography for Life .50	World Civilizations .50	U.S. History II 1.00	U.S. Government and Citizenship .50	
P.E. 1.00	Health .50	1.50	P.E./Health 2.00	Participation Skills and Techniques .50	Fitness for Life .50 / Health Education .50 Lifetime Activities or Sport .50			
The Arts .50	The Arts .50	1.00	Fine Arts 1.50	Fine Arts Courses 1.50				
Keyboarding .50			Digital Literacy .50	Comp. Tech. or Exploring Computer Science .50				
College & Career Awareness 1.00	Exploring Technology .50	1.00	CTE 1.00	Engineering Technology .50	Refer to Career and Technical Education box above.			

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