



Engineering and Design Industry Sector

The Engineering and Design industry sector provides a strong foundation in engineering and design for students in California. The students are engaged in an instructional program that integrates academic and technical preparation and focuses on career awareness, career exploration, and career preparation in five pathways. To prepare students for the vast scope of job opportunities in this field, middle schools, high schools, regional occupational centers and programs, apprenticeship programs, community colleges, and four-year colleges and universities provide education and training in engineering-related occupations. The demand for engineers in a variety of specializations throughout the state and the nation will remain high.

The five pathways in this sector emphasize real-world, occupationally relevant experiences of significant scope and depth. To prepare students for continued training, advanced educational opportunities, and direct entry to a career, the engineering and design programs offer the following components: classroom, laboratory, and hands-on contextual learning; project-based and work-based instruction; internships, community classroom, and cooperative career technical education; work experience education; and leadership and interpersonal skills development.

Engineering and Design Industry Sector Pathways:

- *Architectural and Structural Engineering*
- *Computer Hardware, Electrical, and Networking Engineering*
- *Engineering Design*
- *Engineering Technology*
- *Environmental and Natural Science Engineering*

Entry Level Careers

(with high school diploma)

- Junior Drafter
- CAD Technician
- Construction Apprentice
- Engineering Aide
- Drafting Apprentice
- Apprentice Electrician
- Computer Equipment Installer
- Security Equipment Installer

Technical Level Careers

(with AA or AS degree or certificate)

- Drafter/Designer
- Plan Checker
- Surveyor
- Estimator
- Electrical Engineering Technician
- Mechanical Engineering Technician
- Laboratory Technician
- Civil Engineering Technician
- Chemical Engineering Technician
- Aerospace Engineering Technician
- Architectural Drafters
- Telecommunications Technician
- Journeyman Electrician

Professional Level Careers

(with BS or BA degree)

- Mechanical Engineer
- Aerospace Engineer
- Agricultural Engineer
- Electrical Engineer
- Computer Hardware Engineer
- Telecommunications Engineer
- Landscape Architect
- Materials Engineer
- Nuclear Engineer
- Architect
- Industrial Designer
- Civil Engineer
- Structural Engineer



Engineering Technology Pathway

Sample CTE Courses*

Education Level and Related Occupations**

Introductory	Concentration	Capstone	High School Diploma	Certification and/or AA Degree	Bachelor's Degree or Higher
<ul style="list-style-type: none"> ▪ Exploring Technology ▪ Introduction to Computers ▪ Introduction to Drafting/CADD ▪ Introduction to Electricity/Electronics ▪ Introduction to Engineering Technology ▪ Metal Technology ▪ Technology Core 	<ul style="list-style-type: none"> ▪ Digital Logic Design ▪ Electro-Mechanical Systems ▪ Mechatronics/Robotics 	<ul style="list-style-type: none"> ▪ Electrical/Electronic Technology ▪ Industrial Engineering Technology ▪ Telecommunications 	<ul style="list-style-type: none"> ▪ Apprentice Technician ▪ Electronic Mechanic Helper ▪ HVAC Installer ▪ Telecommunications/Security Equipment Installer 	<ul style="list-style-type: none"> ▪ Electronic Mechanic/Technician ▪ Facilities Technician ▪ Industrial Electronics Technician ▪ Journeyman Engineer ▪ Telecommunications Technician 	<ul style="list-style-type: none"> ▪ Electrical Engineer+ ▪ Facilities Maintenance Engineer ▪ Industrial Engineer Instructor+ ▪ Telecommunications Engineer

Environmental and Natural Science Engineering Pathway

Sample CTE Courses*

Education Level and Related Occupations**

Introductory	Concentration	Capstone	High School Diploma	Certification and/or AA Degree	Bachelor's Degree or Higher
<ul style="list-style-type: none"> ▪ Essentials of Environmental Engineering ▪ Exploring Technology ▪ Introduction to Computers ▪ Introduction to Drafting/CADD ▪ Principles of Engineering ▪ Technology Core 	<ul style="list-style-type: none"> ▪ Computer Technology ▪ Drafting and Computer-aided Design ▪ Hydrology 	<ul style="list-style-type: none"> ▪ Electrical/Electronic Technology ▪ Environmental Science and Technology ▪ Industrial Engineering Technology ▪ Telecommunications 	<ul style="list-style-type: none"> ▪ Environmental Sampling Assistant ▪ Hazardous Material Removal ▪ Environmental Engineering Aide ▪ Environmental Apprentice 	<ul style="list-style-type: none"> ▪ Environmental Engineering Technician ▪ Environmental Planner Assistant ▪ Environmental Sampling Technician ▪ Journeyman Environmental Engineer ▪ Survey-Mapping Technician 	<ul style="list-style-type: none"> ▪ Environmental Engineer+ ▪ Environmental Planner+ ▪ Instructor+ ▪ Survey-Mapping Engineer

*Sample CTE Courses are from the Career Technical Education Framework for California Public Schools (California Department of Education: 2007, <http://www.cde.ca.gov/re/pn/fd/>)

**Visit ASSIST (www2.assist.org/browseAreas.do) for community college and UC/CSU information and California Career Zone (www.cacareerzone.org) for occupation information.

+This occupation requires certification or licensure.

Related Career Technical Student Organization: SkillsUSA (<http://www.skillsusaca.com>)

Additional Industry Sector information available through the California Industrial and Technology Education Consortium (<http://www.citeonline.org>).



Architectural and Structural Engineering Pathway

Sample CTE Courses*

Education Level and Related Occupations**

Introductory	Concentration	Capstone	High School Diploma	Certification and/or AA Degree	Bachelor's Degree or Higher
<ul style="list-style-type: none"> ▪ Introduction to CAD ▪ Introduction to Design Drafting ▪ Principles of Engineering ▪ Technology Core 	<ul style="list-style-type: none"> ▪ Architectural Design ▪ Design Drafting ▪ Engineering Technology ▪ Mechanical Drawing ▪ Technical Drafting 	<ul style="list-style-type: none"> ▪ Advanced Architectural Design ▪ Computer-aided Design (CAD/CAM) ▪ Engineering Design 	<ul style="list-style-type: none"> ▪ CAD Technician ▪ Construction Apprentice ▪ Drafting Apprentice ▪ Engineering Aide ▪ Junior Drafter 	<ul style="list-style-type: none"> ▪ Drafter/Designer ▪ Engineering Technician ▪ Estimator ▪ Plan Checker ▪ Surveyor 	<ul style="list-style-type: none"> ▪ Architect+ ▪ Industrial Designer+ ▪ Civil Engineer+ ▪ Structural Engineer+ ▪ Instructor+

Computer Hardware, Electrical, and Networking Engineering Pathway

Sample CTE Courses*

Education Level and Related Occupations**

Introductory	Concentration	Capstone	High School Diploma	Certification and/or AA Degree	Bachelor's Degree or Higher
<ul style="list-style-type: none"> ▪ Computer Fundamentals ▪ Electricity/Electronics ▪ Exploring Technology ▪ Technical Core 	<ul style="list-style-type: none"> ▪ Computer and Communications Networking ▪ Computer Systems Design/Maintenance ▪ Electrical Codes and Systems 	<ul style="list-style-type: none"> ▪ Computer Networking and Administration ▪ Electrical/Electronic Technology ▪ Essentials of Information Technology (A Plus) 	<ul style="list-style-type: none"> ▪ Apprentice Electrician ▪ Computer Equipment Installer ▪ Computer Repairer ▪ Electrician's Helper ▪ Telecommunications/Security Equipment Installer 	<ul style="list-style-type: none"> ▪ Computer Networking Technician+ ▪ Computer Technician+ ▪ Electrician+ ▪ Journeyman Electrician ▪ Telecommunications Technician 	<ul style="list-style-type: none"> ▪ Computer Engineer ▪ Electrical Engineer+ ▪ Instructor+ ▪ Network Administrator ▪ Telecommunications Engineer

Engineering Design Pathway

Sample CTE Courses*

Education Level and Related Occupations**

Introductory	Concentration	Capstone	High School Diploma	Certification and/or AA Degree	Bachelor's Degree or Higher
<ul style="list-style-type: none"> ▪ Exploring Technology ▪ Introduction to CAD ▪ Introduction to Drafting ▪ Principles of Technology 	<ul style="list-style-type: none"> ▪ Architectural Design ▪ Design Drafting ▪ Engineering Technology ▪ Mechanical Drawing 	<ul style="list-style-type: none"> ▪ Advanced Architectural Design ▪ Computer-aided Design (CAD) ▪ Electrical/Mechanical Technology ▪ Engineering Design 	<ul style="list-style-type: none"> ▪ CAD Technician ▪ Construction Apprentice ▪ Design/Drafting Apprentice ▪ Engineering Aide ▪ Junior Drafter/Trainee 	<ul style="list-style-type: none"> ▪ CAD/CAM Specialist ▪ Drafter/Designer ▪ Engineering Technician ▪ Journeyman Drafter 	<ul style="list-style-type: none"> ▪ Architect+ ▪ Civil Engineer+ ▪ Industrial Designer+ ▪ Instructor+ ▪ Structural Engineer+

*Sample CTE Courses are from the Career Technical Education Framework for California Public Schools (California Department of Education: 2007, <http://www.cde.ca.gov/re/pn/fd/>)

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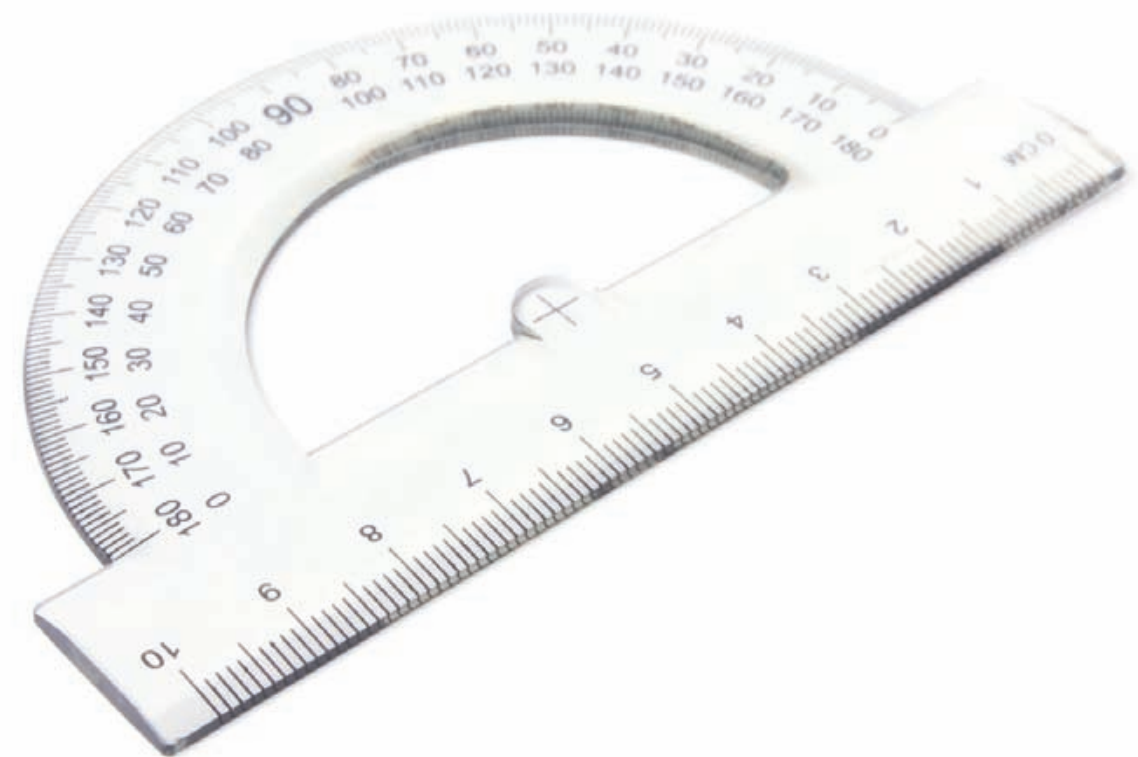
CAREER OPPORTUNITIES IN

ENGINEERING AND DESIGN INDUSTRY SECTOR

10 TIPS FOR CHOOSING THE RIGHT CAREER FOR YOU

*How does a person know what career to work toward?
There is no perfect answer, but the following 10 tips will
get you off to a good start.*

- 1 Get to know yourself** – Complete more than one self-assessment test.
- 2 Identify your strengths and weaknesses** – What do you do well and what do you not do well?
- 3 Develop an inventory of careers** – Write down some careers that might interest you.
- 4 Research different careers** – Talk to others and use the Internet.
- 5 Write the pros and cons** – List positives and negatives about the careers that interest you.
- 6 Network** – Discuss your ideas with others.
- 7 Talk with people who work in your area of interest** – Family and friends are great resources.
- 8 Find a mentor** – Find someone with whom you can discuss your career selection.
- 9 Experiment** – Take a related class or part-time job.
- 10 Don't give up** – "If there is a will, there is a way."



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A Partnership for Success

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Plan For Success
Visit statecenter.com/industrysectors





Career Pathways



Architectural and Structural Engineering Pathway

The Architectural and Structural Engineering Pathway provides learning opportunities for students interested in the safety, cost, design, and construction of a building. Work elements of this pathway often involve working in conjunction with an architect. Students interested in this pathway should possess artistic ability and strong mathematical skills.

CAREERS/CAREER AREAS:

- *Engineering Aide*
- *Architect*
- *Drafter/Designer*
- *Surveyor*
- *Structural Engineer*
- *Civil Engineer*
- *Industrial Designer/Estimator*
- *Instructor*



Computer Hardware, Electrical, and Networking Engineering Pathway

Careers in this pathway are highly technical and require continuing education to stay abreast of constantly changing technology. Students are introduced to the design, manufacturing, assembly, programming, and maintenance of computers and networking systems essential to telecommunications and information

technology. These pathway careers will continue to be in high demand as technological systems become increasingly intricate. Students interested in this pathway should have a desire to understand, diagnose, and create within a technological framework.

CAREERS/CAREER AREAS:

- *Computer Engineer*
- *Electrician*
- *Electrical Engineer*
- *Computer Repair*
- *Computer Networking Technician*
- *Telecommunication Engineer*
- *Network Administrator*



Environmental and Natural Science Engineering Pathway

If your heart is set on protecting the environment, this may be your pathway. Improving and protecting our air, land, and water is the focus of this career area. Students will be involved in the design and development of equipment, processes, and systems used to create, monitor, prevent, or correct environmental events and conditions.

CAREERS/CAREER AREAS:

- *Environmental Planner*
- *Meteorologist*
- *Oceanographer*
- *Ecologist*
- *Hydrographer*
- *Park Naturalist*
- *Survey/Mapping Technician/Engineer*
- *Environmental, Chemical, and Civil Engineer*



Engineering Design Pathway

If you like explaining ideas in a visual way, the Engineering Design Pathway may be for you. Pathway careers encompass the design and production of visual communications. Visual communication is the conveying of ideas and information in forms that can be seen. Students will learn to plan, prepare, and interpret drawings and models through traditional drafting or computer-aided techniques.

CAREERS/CAREER AREAS:

- *CAD/CAM Technician*
- *Civil Engineer*
- *Drafter/Designer*
- *Architect*
- *Structural Engineer*
- *Software Engineer*



Engineering Technology Pathway

The Engineering Technology Pathway provides learning opportunities for students interested in preparing for careers in the design, production, and maintenance of mechanical, telecommunications, electrical, electronics, and electromechanical products and systems.

CAREERS/CAREER AREAS:

- *Electrician/Electronics*
- *Industrial Engineer/Technician*
- *Telecommunications Facility Construction/Maintenance*

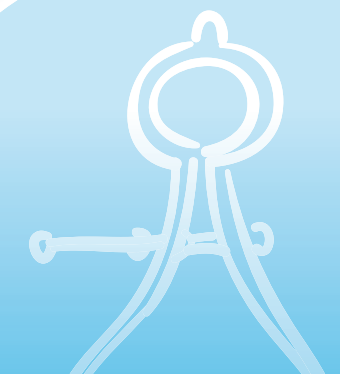
Web sites for further information:

www.californiacareers.info

www.whodouwant2be.com

www.californiacolleges.edu

www.edd.ca.gov/Jobs_and_Training/



TIPS FOR JOB SEEKERS

How can you improve your chances of getting a job? Applying for a job is the easy part, but getting it can be more of a challenge. Following these five tips can help you reach your goal:

1 The Job

- Determine your interests: talk to others and consider your hobbies and talents
- Search “career assessments” on the Internet

2 The Resume

- Should be easy to read: not too long, too wordy or too cluttered
- Make it powerful
- Show you can cooperate, you can learn, and you can do

3 The Application

- Make it neat, complete and accurate
- Include recommendations from teachers, employers, coaches, friends, etc.

4 The Interview

- Show enthusiasm: it separates the winners from the losers
- Dress appropriately/similar to those on the job

5 The Follow-up

- Send a thank you note
- Call to see if a decision has been made
- If not, ask, “Am I still a candidate?”
- If you are, ask, “Is it okay if I call back in a couple of days?”



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