

CONSTRUCTION AND MANUFACTURING TECHNOLOGY

The Construction Technology program provides preparation for a wide variety of positions in the construction field as a contractor, supervisor, building inspector or tradesperson. The program offers the opportunity to be self-employed and the pride and satisfaction of creating and building with your own hands.

Certificates of achievement can be earned in Construction Technology, Construction Management, Building Construction, Building Inspection, Public Works, HVAC/R, Plumbing, Electrical, Residential Maintenance, Renewable Energy and Solar (Photovoltaics). The Associate in Science degree is awarded upon completion of 22.5 semester units in Construction Technology courses and the required general education and elective courses. Transfer to the CSU system for a bachelor's degree in Industrial Technology is available.

Career Opportunities

Building Inspector, Cabinetmaker, Construction Accountant, Construction Estimator, Construction Insurance Agent, Construction Law Specialist, Construction Salesperson, Construction Supervisor, Contractor, Cement Mason, Civil Engineer, Electrician, Environmental Construction Specialist, Financial Specialist, Framer, Hazardous Materials Specialist, Heating and Air Conditioning, Engineer, Job Foreman, Materials Engineer, Metal Building Specialist, Painter, Photovoltaic Technician, Plumber, Project Supervisor, Public Works Technician, Purchasing Agent, Safety Specialist, Soils Engineer, Surveyor, Waste Water Specialist, Water Distribution System Specialist.

Faculty

Bonato, Anthony

Transfer

Some Construction Technology courses transfer to CSU as electives or may fulfill subject credit requirements. Some students in this program choose to pursue a bachelor's degree in Construction Management, Architecture or Engineering. See Architecture and Engineering for transfer requirements for these majors.

CSU Stanislaus, located in the Central Valley not far from the San Francisco Bay area, offers a BS degree in Applied Studies Leadership, to which up to 30 units of VVC's Construction and Manufacturing Technology courses can be applied. Prerequisites: CIS 101 Computer Literacy, ECON 102 Principles of Economics: Micro, and MATH 120 Introduction to Statistics, plus complete the remaining CSU General Education-Breadth requirements (you can use ECON 102 Principles of Economics: Micro and MATH 120 Introduction to Statistics for both). Visit [assist.org](http://www.assist.org) (<http://www.assist.org>) for the most up-to-date information.

Construction Technology, AS (07564)

The Construction Technology program provides preparation for a wide variety of positions in the construction field as a contractor, supervisor, building inspector or tradesperson. The program offers the

opportunity to be self-employed and the pride and satisfaction of creating and building with your own hands.

To earn this degree, complete the major coursework with "C" grades or better and all of the following graduation requirements: 60 minimum degree-applicable units (including a maximum 4 units of activity); 2.0 minimum overall GPA; 12 degree-applicable units through VVC; Information Competency; Global Citizenship; Kinesiology, and the VVC General Education (catalog.vvc.edu/degrees-certificates/vvcge/#vvcge) pattern. Courses may count in one area only, either in the major or in a general education category. Courses counted in one AA/AS major may not be used in another AA/AS major.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 103	Construction Management	3.0
CT 104	Construction Law	3.0
CT 106	Materials of Construction	3.0
CT 110	Bldg Codes and Zoning	3.0
CT 116	Construction Safety	2.0
CT 131	Computer Applications for Technology	4.0
Select one course from the following:		3.0
CT 105	Technical Sketching	
CT 107	Technical Mathematics	
ENGD 103	Blueprint Reading for Construction	
Total Units		22.5

Basic Framing and Carpentry Certificate of Achievement (41095)

This certificate program in Framing and Carpentry prepares the student for a career in residential and commercial building. Students will develop skills in tool use, plan reading, building code knowledge/application, safety, appropriate use of building materials, and communication/soft skills for modern framing and carpentry construction processes.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 106	Materials of Construction	3.0
CT 107	Technical Mathematics	3.0
CT 111A	International Bldg Code I	3.0
CT 116	Construction Safety	2.0
CT 121	Finish Carpentry	4.0
CT 127	Framing	4.0
CT 130	Residential Remodeling	3.0
ENGD 103	Blueprint Reading for Construction	3.0
or CTPW 112	Plan Reading for Public Works	
Total Units		26.5

Construction Technology Certificate of Achievement (36761)

Provides the core knowledge and skills that are common and fundamental to success in a wide variety of construction trades.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 105	Technical Sketching	3.0
CT 106	Materials of Construction	3.0
CT 107	Technical Mathematics	3.0
CT 116	Construction Safety	2.0
CT 131	Computer Applications for Technology	4.0
ENGD 103	Blueprint Reading for Construction	3.0
Total Units		19.5

Building Construction Certificate of Achievement (10799)

Provides the basic knowledge and skills necessary for job opportunities in a wide variety of specific construction trades including masonry, finish carpentry, framing, construction sales, drywall, painting, plumbing, electrical, roofing, heating, ventilation and air conditioning, and surveying.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 104	Construction Law	3.0
CT 105	Technical Sketching	3.0
CT 106	Materials of Construction	3.0
CT 107	Technical Mathematics	3.0
CT 110	Bldg Codes and Zoning	3.0
CT 116	Construction Safety	2.0
CT 131	Computer Applications for Technology	4.0
CT 132	Construction Estimation	3.0
ENGD 103	Blueprint Reading for Construction	3.0
Complete two courses from the following:		8.0-10.0
CT 120A	Electrical Wiring	
CT 120B	Commercial Wiring	
CT 121	Finish Carpentry	
CT 122A	Heat and Air Conditioning	
CT 122B	Commercial Refrigeration	
CT 123	Surveying	
CT 124	Plumbing	
CT 125	Concrete/Masonry	
CT 127	Framing	
CT 144	Photovoltaic Systems and Installation	
Complete 4-6 units from the following:		4.0-6.0
CT 60A	Construction Lab	
CT 60B	Construction Lab	
CT 60C	Construction Lab	
CT 60D	Construction Lab	
CT 130	Residential Remodeling	
CT 148	Introduction to Construction And Installation	
Total Units		40.5-44.5

Building Inspection Certificate of Achievement (07565)

Provides a thorough background and skill level for employment in the building inspection field. This certificate prepares the student for employment in City and County Building and Safety departments as a private industry or corporate job site inspector.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 106	Materials of Construction	3.0
CT 110	Bldg Codes and Zoning	3.0
CT 111A	International Bldg Code I	3.0
CT 111B	International Bldg Code II	3.0
CT 112	Uniform Mechanical Code	3.0
CT 113	Uniform Plumbing Code	3.0
CT 114	National Electrical Code	3.0
CT 115	Technical Office Procedures and Field Inspection	3.0
CT 131	Computer Applications for Technology	4.0
ENGD 103	Blueprint Reading for Construction	3.0
Complete one course from the following:		2.0-3.0
CT 105	Technical Sketching	
CT 107	Technical Mathematics	
CT 116	Construction Safety	
Total Units		34.5-35.5

Construction Management Certificate of Achievement (07566)

Provides the skills and background necessary for employment as a contractor, construction business manager, construction supervisor, or foreman when linked with appropriate, trade-specific knowledge.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 103	Construction Management	3.0
CT 104	Construction Law	3.0
CT 106	Materials of Construction	3.0
CT 109	Construction Financing	3.0
CT 110	Bldg Codes and Zoning	3.0
CT 116	Construction Safety	2.0
CT 131	Computer Applications for Technology	4.0
CT 132	Construction Estimation	3.0
ENGD 103	Blueprint Reading for Construction	3.0
Complete one course from the following:		3.0
CT 105	Technical Sketching	
CT 111A	International Bldg Code I	
CT 133	Precision Estimation	
Total Units		31.5

Basic Electrician Technician Certificate of Career Preparation

This certificate provides the necessary knowledge and skill level required for employment in the electrical industry.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 105	Technical Sketching	3.0
CT 106	Materials of Construction	3.0
CT 107	Technical Mathematics	3.0
or CT 108	Advanced Technical Math	
CT 114	National Electrical Code	3.0
CT 116	Construction Safety	2.0
CT 120A	Electrical Wiring	4.0
CT 120B	Commercial Wiring	4.0
CT 131	Computer Applications for Technology	4.0
ENGD 103	Blueprint Reading for Construction	3.0
Total Units		30.5

Basic Heating, Ventilation, Air Conditioning and Refrigeration (HVAC/R) Service Technician Certificate of Career Preparation

This certificate provides the basic knowledge and skills necessary for job opportunities in heating, ventilation and air conditioning.

Code	Title	Units
Required Courses		
CT 107	Technical Mathematics	3.0
or CT 108	Advanced Technical Math	
CT 116	Construction Safety	2.0
CT 122A	Heat and Air Conditioning	4.0
CT 122B	Commercial Refrigeration	4.0
CT 136	Hvac Circuits and Controls	4.0
Total Units		17

Plumbing Technician Certificate of Career Preparation

This certificate provides the necessary knowledge and skill level required for employment in the plumbing industry.

Code	Title	Units
Required Courses		
CT 107	Technical Mathematics	3.0
or CT 108	Advanced Technical Math	
CT 113	Uniform Plumbing Code	3.0
CT 116	Construction Safety	2.0
CT 124	Plumbing	4.0
CTMT 121	Plumbing Repair	3.0
Total Units		15

Public Works Certificate of Achievement (07569)

This certificate provides the necessary skill level for employment on public works projects. Public works includes construction of streets and highways, water distribution systems, and waste water systems.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 103	Construction Management	3.0
CT 104	Construction Law	3.0
CT 106	Materials of Construction	3.0
CT 116	Construction Safety	2.0
CT 131	Computer Applications for Technology	4.0
CTPW 111	Introduction to Public Works	3.0
CTPW 112	Plan Reading for Public Works	3.0
CTPW 113	Public Works Inspection	3.0
CTPW 114	Public Works Administration	3.0
Complete two courses from the following:		6.0-7.0
CT 123	Surveying	
CTPW 115	State and Hwy Construction	
CTPW 116A	Water Distribution Systems I	
CTPW 117	Portland Cement Concrete	
CTPW 118	Solid Waste Management	
CTPW 119	Wastewater Operations	
Complete one course from the following:		3.0
CT 105	Technical Sketching	
CT 107	Technical Mathematics	
ENGD 103	Blueprint Reading for Construction	
Total Units		37.5-38.5

Basic Residential Maintenance Technician Certificate of Career Preparation

This certificate provides the necessary knowledge and skill level required for employment in the residential maintenance and repair industry.

Code	Title	Units
Required Courses		
CT 107	Technical Mathematics	3.0
or CT 108	Advanced Technical Math	
CT 116	Construction Safety	2.0
CTMT 120	Residential Maintenance & Repair	4.0
CTMT 121	Plumbing Repair	3.0
CTMT 122	Electrical Repair	3.0
Total Units		15

Basic Woodworking Certificate of Career Preparation

This certificate demonstrates a basic understanding of wood, joinery and woodworking skills and the ability to safely and appropriately use common hand tools, power tools and equipment to perform common

woodworking tasks. This certificate can lead to employment in a wide variety of woodworking trades.

Code	Title	Units
Required Courses		
CTMF 120A	Woodworking Tools & Equipment	2.0
CTMF 121A	Basic Woodworking	3.0
CTMF 121B	Intermediate Woodworking	3.0
CTMF 122	Advanced Wood Topics	3.0
CTMF 129A	Woodturning	3.0
CTMF 129B	Advanced Woodturning	3.0
Total Units		17

Renewable Energy Certificate of Career Preparation

This certificate demonstrates an understanding of renewable generation and the effects of fossil fuel use on our environment, economy and society. This certificate can lead to employment in the renewable energy field.

Code	Title	Units
Required Courses		
CT 105	Technical Sketching	3.0
CT 107	Technical Mathematics	3.0
or CT 108	Advanced Technical Math	
CT 142	Renewable Energy Fundamentals	3.0
CTMT 122	Electrical Repair	3.0
Complete one course from the following:		2.0-5.0
CT 143A	Renewable Energy Laboratory A: Photovoltaic	
CT 143B	Renewable Energy Lab B: Solar Thermal	
CT 143C	Renewable Energy Laboratory C: Wind	
CT 143D	Renewable Energy Lab D: Alternative Fuels	
Total Units		14-17

Photovoltaic Technician Certificate of Career Preparation

This certificate provides the basic knowledge and skills for employment in the Photovoltaic Industry as a System Installer, Designer, or Electrician and include preparation to take the National Association of Certified Energy Providers (NABCEP) Entry-Level exam.

Code	Title	Units
Required Courses		
CT 101	Careers in Construction & Manufacturing	1.5
CT 114	National Electrical Code	3.0
CT 120A	Electrical Wiring	4.0
CT 142	Renewable Energy Fundamentals	3.0
CT 144	Photovoltaic Systems and Installation	6.0
Total Units		17.5

Construction and Manufacturing Technology Courses

CT 60A Construction Lab (1-4 Units)

This is a variable unit (1-4) laboratory class to provide advanced skill development in the following areas: electrical wiring, finish carpentry, heating and air conditioning, framing, plumbing and concrete and masonry construction. Students will complete 48-54 hours per unit of projects over the course of the class.

Lab Hours: 54.00

Transfer: Not transferable

CT 60B Construction Lab (1-4 Units)

A laboratory class to provide additional skill development in the following areas: electrical wiring, finish carpentry, heating and air conditioning, framing, plumbing and concrete and masonry construction. Students will complete contract projects.

Lab Hours: 54.00

Transfer: Not transferable

CT 60C Construction Lab (1-4 Units)

A laboratory class to provide additional skill development in the following areas: electrical wiring, finish carpentry, heating and air conditioning, framing, plumbing and concrete and masonry construction.

Lab Hours: 54.00

Transfer: Not transferable

CT 60D Construction Lab (1-4 Units)

A laboratory class to provide advanced skill development in the following areas: electrical wiring, finish carpentry, heating and air conditioning, framing, plumbing and concrete and masonry construction.

Lab Hours: 54.00

Transfer: Not transferable

CT 90 Introduction to Construction (3.0 Units)

A foundational Construction course that prepares students for further Construction education and training. Topics include: tool safety and use, construction drawings, math, safety, and basic employability skills. Students who successfully complete CT 90 and CT 91 earn the Multi-Craft Core Curriculum (MC3) Certification for Pre-Apprenticeship, a national construction union certification.

Lecture Hours: 54.00

Transfer: Not transferable

CT 91 Introduction to Construction Lab (2.0 Units)

Lab and skill performance companion to CT 90, prepares students for further Construction education and training. Topics include: tool safety and use, construction drawings, math, safety, and basic employability skills. Students who complete both CT 90 and CT 91 earn the Multi-Craft Core Curriculum (MC3) Pre-Apprenticeship certification.

Co-requisite(s): CT 90

Lab Hours: 108.00

Transfer: Not transferable

CT 101 Careers in Construction & Manufacturing (1.5 Units)

This course is designed to provide the construction and manufacturing technology student with information and skills necessary to understand current job market needs and prepare a successful educational plan to obtain their desired goals. Students will develop an awareness of occupations and develop an awareness of occupations and develop skills for seeking employment and completing job applications, resumes and interviews.

Lecture Hours: 27.00

Transfer: Transfers to CSU only

CT 103 Construction Management (3.0 Units)

Principles of management as they specifically relate to the construction industry. This course explores the relationship and importance of proper planning, estimating, contracting, financing and building. Also covered are leadership and supervisory skills and employer/employee relationship and safety.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 104 Construction Law (3.0 Units)

Principles of contracting, real estate and construction law. Course includes legal aspects of building codes, contractors licenses, workmen's compensation, social security, state safety regulations and lien laws as they apply to the construction trade.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 105 Technical Sketching (3.0 Units)

A course designed to develop sketching skills and introduce sketching techniques currently used in the industrial and architectural fields. Course will include principals of oblique, isometric and perspective sketching, including shading and shadows.

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 106 Materials of Construction (3.0 Units)

A study of common materials used in residential and commercial construction. Course includes use and limitations of soil, paving materials, concrete, lumber, wall materials, roofing, insulation, siding, sheet material, electrical and plumbing materials and fixtures. This course will also explore the use of steel, aluminum and plastics in modern construction.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 107 Technical Mathematics (3.0 Units)

Review of basic arithmetic, fractions, decimals and percentages. Introduction to basic algebra and trigonometry as they apply to manufacturing and construction trades.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 108 Advanced Technical Math (3.0 Units)

This course will include the practical applications of geometry, trigonometry, and unit analysis in an applied setting. Class emphasis will be on the solution of technical problems commonly found in the career technical fields of aviation, automotive, electronics, electrical, engineering/drafting, construction and welding.

Prerequisite(s): MATH 90 or MATH 90S

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 109 Construction Financing (3.0 Units)

This course introduces the basic issues and concepts of construction finance. Course examines the procedures for evaluation of all types of real estate credit and is designed to enable borrowers to utilize their resources to obtain financing.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 110 Bldg Codes and Zoning (3.0 Units)

Use of the International Building Code and the various related state and local ordinances for plan checking and building compliance. Course includes a basic understanding of building codes and zoning as they apply to the construction and inspection of residential and light commercial buildings.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 111A International Bldg Code I (3.0 Units)

The first of a two part, in-depth study of the contents and applications of the Uniform Building Code and California amendments with emphasis on residential construction. Course includes building classifications by occupancy and type, engineering regulations and design requirements applicable to plan checking and structural building inspection.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 111B International Bldg Code II (3.0 Units)

A continuing in-depth study of the International Building Code and California amendments with emphasis on commercial applications. Course includes energy conservation standards, specialized commercial structures, public safety and standards for handicapped accessibility.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 112 Uniform Mechanical Code (3.0 Units)

This class is an indepth study of the contents and applications of the Uniform Mechanical Code. Course covers the use of this code for plan checks and inspection of residential and commercial structures.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 113 Uniform Plumbing Code (3.0 Units)

This course is an indepth study of the contents and applications of the Uniform Plumbing Code. Course includes underground and above ground water, gas and air pipe installations for residential and commercial structures.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 114 National Electrical Code (3.0 Units)

This class is an in-depth study of the contents and applications of the National Electrical Code. Course covers the use of the Code for plan checks and inspection of residential and commercial structures. Plan reading, electrical theory, wiring methods and installation of electrical components and fixtures are also included.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 115 Technical Office Procedures and Field Inspection (3.0 Units)

Office organization, procedures and necessary paperwork pertinent to building and safety office management and inspection. Field inspection for completed buildings, zoning, health and safety ordinance applications. Course includes several field trips.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 116 Construction Safety (2.0 Units)

Covers OSHA policies, procedures, and standards, as well as safety for general industry and health principles. Topics include scope and application of the OSHA general industry standards. Special emphasis is placed on those areas that are the most hazardous, using OSHA standards as a guide. Upon successful course completion, the student will receive either an OSHA 10 or 30 hour general industry or construction industry training completion card. 36 hours lecture.

Lecture Hours: 36.00

Transfer: Transfers to CSU only

CT 119 Load Calculations/Circuit Design (2.0 Units)

This course is designed to develop the skills necessary to visualize and correctly interpret drawings, diagrams, blueprints, and schematics common to the electrical industry. Course includes branch and feeder circuit design and load calculations as they apply to residential, multi-family, commercial and industrial applications.

Lecture Hours: 27.00; Lab Hours: 27.00

Transfer: Transfers to CSU only

CT 120A Electrical Wiring (4.0 Units)

Theory, procedure and techniques for electrical wiring of residential and light commercial construction. Topic areas include blueprint reading, power panels, wire sizing, conduit bending and installation, pulling and installation of wires, lighting and plug circuitry, designated circuits, underground and swimming pool wiring.

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 120B Commercial Wiring (4.0 Units)

Learn the techniques necessary for commercial wiring. Size conductors for motor, intermittent and continuous loads. Wire for single and three phase services. Course includes wiring techniques common to commercial applications, running circuits with flex, electrical metallic tubing, rigid and liquid tight conduits and use of common conductors, cables, boxes and raceways. Includes transformer and motor load calculations, starters and over current protection devices.

Prerequisite(s): CT 120A, Minimum grade C

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 121 Finish Carpentry (4.0 Units)

Course covers use of hand and machine woodworking tools and techniques common to finish carpentry and cabinet making. Students will develop skill in safe and efficient operation of common tools, layout, cutting, assembly and finish of woodworking projects.

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 122A Heat and Air Conditioning (4.0 Units)

This course provides instruction for layout, installation and repair of common residential and light commercial heating and air conditioning systems. Heating and air conditioning theory and energy calculations will be treated in detail. Course also includes use of solar energy for heating and cooling.

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 122B Commercial Refrigeration (4.0 Units)

Explore the more complex commercial and industrial uses of refrigeration, heating and air conditioning. Course covers installation and repair of the most common commercial refrigeration systems found in the food industry and industrial and manufacturing environments. Also included are computer controlled and central plant environmental systems, high and low pressure chillers, cooling towers and air handlers.

Prerequisite(s): CT 122A

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 122C Heat Pump Fundamentals/Controls (4.0 Units)

This course explores electrical and mechanical circuitry fundamentals, along with theory, operation and application of heat pump systems used in residential and light commercial heating installations including the heat pump refrigeration cycle, reversing valves, defrost methods of supplemental heat, balance point, air flow, and heat pump thermostats.

Lecture Hours: 54.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 123 Surveying (4.0 Units)

A course designed to explore the principles and applications of surveying. Students will develop skill in the operation of surveying equipment used for measuring, leveling and locating of points. Course includes surveying techniques common to building and highway construction, general land surveying, hydrographic surveys and photogrammetric mapping.

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 124 Plumbing (4.0 Units)

This course provides instruction for layout and installation of residential and light commercial plumbing systems and fixtures. Rough and finish stages of plumbing will be introduced and students will become familiar with reading plans and calculating and constructing the plumbing system.

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 125 Concrete/Masonry (4.0 Units)

Course covers use of hand and machine tools and techniques common to residential and light commercial concrete and masonry construction.

Plan reading, layout, forming, pouring of concrete, tilt-up and various finishing techniques will be introduced. Course also includes construction with brick, stone, concrete block, and other masonry shapes.

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 126 Exploring Brick and Block (1.5 Units)

Grade Option. This course includes techniques used for construction of brick and block walls, decorative brick patios, planter edging and concrete slabs, curbs and walks. Class covers information on concrete and mortar mixes and proper forming, pouring and finishing of concrete slab wall footings.

Lecture Hours: 18.00; Lab Hours: 27.00

Transfer: Transfers to CSU only

CT 127 Framing (4.0 Units)

Course covers use of hand and machine tools and techniques common to rough carpentry and residential and light commercial framing. Students will develop skill in safe and efficient operation of common tools, layout techniques, cutting and assembly of wall, ceiling and roof framing, and installing sheathing and insulation.

Lecture Hours: 36.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 129 Independent Study (3.0 Units)

Transfer: Not transferable

CT 130 Residential Remodeling (3.0 Units)

Grade Option. Learn the skills and techniques necessary for remodeling of structures. Course includes project planning, estimation and layout. Gain experience in framing, plumbing, electrical, dry wall, floor and wall finishing and concrete with projects that include patio and deck construction, room additions and kitchen and bathroom remodeling.

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 131 Computer Applications for Technology (4.0 Units)

This course is designed to introduce the student to the potentials of the computer as it directly applies to the construction industry. Course includes instruction and practice in the following common program types: operating system, word processing, presentation, spreadsheet, e-mail, web-page design, publishing, estimation, and introductory computer aided drafting.

Lecture Hours: 54.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 132 Construction Estimation (3.0 Units)

Learn how to bid accurately and profitably. Course will teach you how to account for materials, labor, taxes, insurance, overhead, and profits across various trades in preparing winning estimates. Speed up your estimating process and increase your accuracy using today's leading construction estimation software. Estimating software allows take-offs using quick, single and assembly methods to meet your particular estimating needs.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 133 Precision Estimation (3.0 Units)

Learn how to speed up your estimating process and increase your accuracy using today's leading construction estimation software. Estimating software allows take-off using quick, single and assembly methods. Course includes development and maintenance of your database. Create your own crews, add-ons, formulas and assemblies to meet your particular estimating needs.

Lecture Hours: 36.00

Transfer: Transfers to CSU only

CT 136 Hvac Circuits and Controls (4.0 Units)

This course explores electrical fundamentals common to the heating, ventilation, air conditioning and refrigeration fields. Course includes electrical theory, control circuitry and electronics, system supply circuitry and alternating and direct current troubleshooting.

Lecture Hours: 54.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 137 Sheet Metal Fabrication (3.0 Units)

This course will introduce the student to the fundamental elements, methods and principals of sheet metal design, fabrication and installation. Course includes air handling systems, gutters, flashings, coping, tanks and exhaust systems. Students will gain valuable hands-on skills in the proper use of metal working hand and machine tools through the completion of multiple projects.

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 138 Coop Ed Construction Technology (1-8 Units)

Cooperative Education is a key element of Victor Valley College's comprehensive approach to career development. Cooperative Education is a 16-, 12-, or 8-week course that enables students to receive college credit for paid or unpaid work opportunities. This course helps students gain valuable on-the-job work experience while providing practical education, best practices in professional development, and academic guidance through the course of their work opportunity. The combination of practical experience and curricular development empowers students to be more competitive, efficient and valuable employees upon completion of this program and/or their academic program trajectory. The course is ideal for students who are cross-training at their current worksite for upward mobility or seeking career changes, as well as those looking for entry-level occupational training through work-based learning experiences such as through an internship. Cooperative Education transforms community businesses, industries, and public agencies into expanded educational training laboratories. Credit is awarded on the basis of learning objectives completed and the number of hours the student trains. Students must create/complete new learning objectives each semester they enroll. Students may utilize their present work sites.

Transfer: Transfers to CSU only

CT 140 Construction Internship (4.0 Units)

Gain valuable hands-on construction skills by participating in the creation and operation of a small construction business. Students will research the market, design the project, estimate the costs, develop a business plan, secure a construction loan, prepare a schedule and analyze the projects progress and perform customer service and sales. Grade Option.

Lecture Hours: 72.00

Transfer: Transfers to CSU only

CT 142 Renewable Energy Fundamentals (3.0 Units)

This course explores methods of generation and use of renewable energy. Topics include renewable fuel based generators, fuel cells, wave and tidal generation, geothermal, wind turbines, photovoltaic, barometric pressure, and hydroelectric generation. Course also covers active and pasive solar heating and cooling, alternate fueled vehicles and electric transportation.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CT 143A Renewable Energy Laboratory A: Photovoltaic (2.0 Units)

This course explores using photovoltaic technology to generate electricity for various applications: residential, remote, portable,auxiliary, or mobile.

Co-requisite(s): CT 142

Lecture Hours: 18.00; Lab Hours: 54.00

Transfer: Not transferable

CT 143B Renewable Energy Lab B: Solar Thermal (2.0 Units)

This course explores using solar thermal technology for various applications including passive/active heating/cooling and generating electricity.

Co-requisite(s): CT 142

Lecture Hours: 18.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 143C Renewable Energy Laboratory C: Wind (2.0 Units)

This course explores renewable energy with a focus on wind electrical generation through the completion of actual projects.

Co-requisite(s): CT 142

Lecture Hours: 18.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 143D Renewable Energy Lab D: Alternative Fuels (2.0 Units)

This course explores using alternative fuels for transportation, heating systems, and generating electricity through the construction of an actual project.

Co-requisite(s): CT 142

Lecture Hours: 18.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CT 144 Photovoltaic Systems and Installation (6.0 Units)

Residential Solar Industry preparation: PV system components/function, building codes, sizing/design, and solar principles. Lab: design, safely install, and trouble-shoot multiple systems.

Lecture Hours: 72.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

CT 148 Introduction to Construction And Installation (5.0 Units)

A foundational construction course that prepares students for further construction education and training. Topics include: tool safety and use, construction drawings, math, safety, and basic employability skills.

Students who complete the course can test to be certified in the Core Curriculum of the National Center for Construction Education and Research, a national construction certification. CSI-J.

Lecture Hours: 54.00; Lab Hours: 108.00

Transfer: Transfers to CSU only

Construction Technology Manufacturing Courses

CTMF 120A Woodworking Tools & Equipment (2.0 Units)

This course is designed to give the woodworking student an in-depth knowledge of common woodworking tools and equipment. Students will explore the safety, use and maintenance of saws, lathes, routers, planers, jointers, sanders and common power and hand tools used for basic woodworking projects.

Lecture Hours: 36.00

Transfer: Transfers to CSU only

CTMF 121A Basic Woodworking (3.0 Units)

This is a beginning woodworking class. Topics covered include safety, tools, the composition of wood and its characteristics, beginning design and sketching, project planning, measuring and cutting, use of large and small power tools, and general woodworking techniques. Students will be expected to complete multiple projects as part of their grade.

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMF 121B Intermediate Woodworking (3.0 Units)

This is an intermediate woodworking class. Topics include safety, tools, the composition of wood and its characteristics, finishing, intermediate design and sketching, and project planning. Students will generate shop drawings adequate to build the project. Students will measure, cut, and use power tools and general woodworking techniques.

Prerequisite(s): CTMF 121A, Minimum grade C

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMF 121C Advanced Woodworking I (3.0 Units)

This is an advanced course in fine woodworking using techniques common to custom wood products, furniture making and wood art. Learn the artisan's techniques for wood joining, carving, turning and finishing by completing various wood projects. Course includes a study of common woods, tools and methods for shaping and finishing.

Prerequisite(s): CTMF 121B, Minimum grade C

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMF 121D Advanced Woodworking II (3.0 Units)

The second advanced course in fine woodworking using techniques common to custom wood products to learn the artisan's techniques for wood joining, carving, and finishing.

Prerequisite(s): CTMF 121C, Minimum grade C

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMF 122 Advanced Wood Topics (3.0 Units)

Come develop your skills and learn the methods and procedures necessary for completing an advanced woodworking project. One specific advanced woodworking project is selected as the focus for each semester. Check with the Construction Technology department for the current project. Course may also include specialized techniques of turning, marquetry, parquetry, carving and intarsia. Grade option.

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMF 129A Woodturning (3.0 Units)

This introductory course will provide the woodworking student with information and skills necessary to successfully design, turn and finish typical woodturning projects. Course includes lathe, spindle, faceplate and drive chuck turning. Students will complete a variety of projects that can include pens and pencils, games and topy pieces, decorations, lamps, spindles, bowls and boxes.

Prerequisite(s): CTMF 120A, Minimum grade C

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMF 129B Advanced Woodturning (3.0 Units)

This advanced woodturning course includes green, seasoned and laminated wood and acrylic projects. Students will explore turning of large bowls and platters, maintaining natural edges, turning burls, proper box and lid construction, off center turning, chatter finishes and construction of tuning fixtures, centers and drives. Grade option.

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

Construction Technology Maintenance Courses

CTMT 120 Residential Maintenance & Repair (4.0 Units)

This class covers all major aspects of preventative maintenance and repair for residential and light commercial buildings. Topics covered include but are not limited to repairing roofing, plumbing, electrical, framing, installation, drywall, painting, concrete, flooring, safety, tools, heating and cooling, etc., as they apply to the maintenance and repair industry.

Lecture Hours: 54.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMT 121 Plumbing Repair (3.0 Units)

This class covers most aspects of residential and light commercial plumbing repair. Topics covered include but are not limited to plumbing tools, water supply systems, drainage systems, drainage problems, faucets and valves, piping, soldering and threading, water heating systems, plumbing fixtures, pricing, billing, and inventory management as they apply to the plumbing repair business.

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMT 122 Electrical Repair (3.0 Units)

This class covers most aspects of residential and light commercial electrical repair. Topics covered include but are not limited to electrical tools, electrical theory, wiring systems, electrical materials, electrical services, trouble shooting electric circuits, low voltage circuits, appliances and motors, and mathematics for electricians.

Lecture Hours: 36.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

CTMT 123 Custodial Maintenance (4.0 Units)

This course covers the major aspects of custodial and janitorial work. Course includes general cleaning techniques, cleaning equipment use and maintenance, cleaning chemicals, window care, maintaining hard floors, carpet and upholstery care, chemical hazards, Cal OSHA regulations, and handling of infectious waste as they apply to the janitorial industry.

Lecture Hours: 54.00; Lab Hours: 54.00

Transfer: Transfers to CSU only

Construction Technology Public Works Courses

CTPW 111 Introduction to Public Works (3.0 Units)

Working knowledge of the aspects of Public Works organization and maintenance requirements of local government recommended. Introduction to techniques, materials and equipment used in Public Works maintenance and construction. Meets the standards of the American Public Works Association, Street Superintendents' Association and Inspectors' Association.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CTPW 112 Plan Reading for Public Works (3.0 Units)

Plan reading for the construction of water, sewers, storm drain, and sewage facility projects. Basic survey methods, symbols, mathematical conversions, and determination of slope and grade.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CTPW 113 Public Works Inspection (3.0 Units)

General public works inspection techniques. Includes Portland Cement and asphalt concretes, soils, base and subgrade, safety, contracts, and specifications. Responsibilities of the contractor, engineer, agency, and inspector.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CTPW 114 Public Works Administration (3.0 Units)

Introduction to the organizational concepts used by the Public Works Departments. Includes typical organizational and management concepts, political considerations, planning, budget management and public relations.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CTPW 115 State and Hwy Construction (3.0 Units)

Methods of estimating costs and construction for street construction and maintenance. Includes codes and ordinances, management and budget principles; equipment maintenance records and safety practices.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CTPW 116A Water Distribution Systems I (3.0 Units)

Water distribution systems operation. Fundamentals of water production, quality, and system operation. Includes piping, services, pumps, reservoirs, mathematics, and basic hydraulics. Preparation for Grades I and II Water Distribution Operator Certification.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CTPW 117 Portland Cement Concrete (3.0 Units)

Portland Cement concrete design and uses. Covers transporting, placing, curing, and testing Portland Cement concrete. Applications and construction methods employed.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CTPW 118 Solid Waste Management (3.0 Units)

Methods used in collection of solid waste materials. Includes equipment, scheduling, and customer relations. Ultimate disposal of solid waste matter as well as projections concerning future collection and disposal operations. Special emphasis on municipal resource recovery, salvaging, and recycling.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

CTPW 119 Wastewater Operations (3.0 Units)

A comprehensive examination of wastewater operations, impact of waste contributions from home and industry, effects of wastewater treatment, water reclamation and by-product disposal.

Lecture Hours: 54.00

Transfer: Transfers to CSU only

Program Learning Outcomes

Program Learning Outcomes (PLOs) are statements of the kind of learning a program hopes a student will achieve. The PLOs describe the knowledge, skills, problem-solving, communication and values that apply to all certificates and/or degrees within that program.

Upon completion of this program, students should be able to:

1. Identify procedures and strategies to minimize safety hazards and environmental impact associated with construction and manufacturing projects.
2. Properly perform construction and manufacturing trade work following standard industry practice.
3. Describe building code and legal requirements associated with construction and manufacturing projects.