2021-2022 Official Catalog

Construction

Overview

The Construction Technology programs at Cosumnes River College are preparing students for work in new construction, remodel, and energy auditing industries. Course offerings include everything from entry level trades courses, all the way to national certification. Students will train at the college, and at real jobsites. Traditional building practices are covered, but advanced framing techniques, energy efficiency, health and safety, and sustainability are emphasized.

Degrees and Certificates Offered

A.S. in Construction
Construction Pre-Apprenticeship Certificate
Construction Certificate
Green Buildings Certificate
Solar Installers Certificate

Dean
Bob Johnson
Department Chair
Ryan Connally
Phone
(916) 525-4323
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Associate Degree

A.S. in Construction

This program trains students for an industry that is one of the largest employers in the nation. CRC's construction program is designed to provide students with basic and applied technical skills and knowledge necessary for employment in the building and construction industry. Standard construction procedures are emphasized throughout the program.

HIGHLIGHTS
*Articulation agreements for transfer to specific four-year institutions
*Field trips to a variety of new and existing construction structures for study and appreciation

Catalog Date: January 1, 2022

Degree Requirements

<table>
<thead>
<tr>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMT 112</td>
<td>Construction Estimating</td>
<td>3</td>
</tr>
<tr>
<td>CMT 120</td>
<td>Legal Aspects of Construction</td>
<td>3</td>
</tr>
<tr>
<td>CMT 136</td>
<td>Construction Safety</td>
<td>3</td>
</tr>
<tr>
<td>CMT 300</td>
<td>Introduction to Construction Plans and Specifications (3)</td>
<td>3</td>
</tr>
<tr>
<td>or BIT 102</td>
<td>Plan Reading and Non-Structural Plan Review (3)</td>
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<tr>
<td>CMT 310</td>
<td>Materials of Construction</td>
<td>3</td>
</tr>
<tr>
<td>CMT 313</td>
<td>Computer Estimating for Construction</td>
<td>3</td>
</tr>
<tr>
<td>BIT 100</td>
<td>Introduction to the International Building Code</td>
<td>3</td>
</tr>
<tr>
<td>CONST 105</td>
<td>Rough Carpentry I - Tools, Materials, and Foundations</td>
<td>3</td>
</tr>
<tr>
<td>CONST 106</td>
<td>Rough Carpentry II - Floors, Walls, and Roof Framing</td>
<td>3</td>
</tr>
<tr>
<td>CONST 107</td>
<td>Rough Carpentry III - Exterior Finishes</td>
<td>3</td>
</tr>
<tr>
<td>CONST 108</td>
<td>Finish Carpentry I - Interior Finish</td>
<td>3</td>
</tr>
<tr>
<td>Total Units:</td>
<td></td>
<td>33</td>
</tr>
</tbody>
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The Construction Associate in Science (A.S.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See CRC
Student Learning Outcomes

Upon completion of this program, the student will be able to:

- **PSLO #1**: Career Options and Goals- Summarize career options in the industry, and formulate initial career goals.
- **PSLO #2**: Tools- Identify common hand and power tools used in the trades and residential building science, and demonstrate competence in their safe and efficient use.
- **PSLO #3**: Analysis of building materials- Examine various building materials, and compare their strengths and weaknesses as they relate to structural integrity, sustainability, and environmental impact.
- **PSLO #4**: Safety- Explain the relevance of the Occupational Safety and Health Administration, and interpret those regulations specific to the construction industry
- **PSLO #5**: Building principles- Utilize fundamental building principles to layout and construct residential and light carpentry structures
- **PSLO #6**: Analysis of Sustainability- Understand the principles of Green Building and compare and contrast emerging techniques with traditional production building methods.
- **PSLO #7**: Building Performance Testing- Perform shell and duct diagnostics, and prescribe measures that can be tested and retested for marked improvement in the energy efficiency of the home.

Career Information

Entry level trades jobs, such as carpenter, electrician, plumber, cement mason. Those jobs can lead to other jobs such as foreman, superintendent, project manager, General contractor, estimator, scheduler, building inspector, safety manager, and even energy auditor.

Construction Certificate

This program prepares students for entry into the building and construction industry as a general tradesperson; and prepares students currently working within the industry for advancement.
## Certificate Requirements

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<tr>
<td>CONST 108</td>
<td>Finish Carpentry I - Interior Finish</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Units:</strong></td>
<td></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>

Upon completion of this program, the student will be able to:

- PSLO #1: Career Options and Goals- Summarize career options in the industry, and formulate initial career goals.
- PSLO #2: Tools- Identify common hand and power tools used in the trades and residential building science, and demonstrate competence in their safe and efficient use.
- PSLO #3: Analysis of Building Materials- Examine various building materials, and compare their strengths and weaknesses as they relate to structural integrity, sustainability, and environmental impact.
- PSLO #4: Safety- Explain the relevance of the Occupational Safety and Health Administration, and interpret those regulations specific to the construction industry
- PSLO #5: Building Principles- Utilize fundamental building principles to layout and construct residential and light carpentry structures
- PSLO #6: Analysis of Sustainability- Understand the principles of Green Building and compare and contrast emerging techniques with traditional production building methods.
- PSLO #7: Building Performance Testing- Perform shell and duct diagnostics, and prescribe measures that can be tested and retested for marked improvement in the energy efficiency of the home.

## Green Buildings Certificate

The purpose of this certificate is to develop job skills and an understanding of green strategies for high performance buildings and livable communities. It is focused at students and professionals in the fields of architecture; construction; building management; construction management; building inspection; design technology; landscape; and planning, who want to acquire a comprehensive knowledge of an integrated, economic life-cycle approach to the design of the built environment. It includes study of green rating systems, material choices and environmental strategies for a livable, sustainable future.

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<tr>
<th>COURSE CODE</th>
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<tbody>
<tr>
<td>ARCH 342</td>
<td>Introduction to Green Buildings</td>
<td>3</td>
</tr>
<tr>
<td>CMT 310</td>
<td>Materials of Construction</td>
<td>3</td>
</tr>
<tr>
<td><strong>A minimum of 12 units from the following:</strong></td>
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<tr>
<td>ARCH 332</td>
<td>Design Awareness (3)</td>
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<tr>
<td>ARCH 334</td>
<td>Advanced Design in Three Dimensions (3)</td>
<td></td>
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<tr>
<td>ADT 320</td>
<td>Architectural Design Technology - Building Information Modeling (BIM) I (3)</td>
<td></td>
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<tr>
<td>ADT 322</td>
<td>Architectural Design Technology - Building Information Modeling (BIM) II (3)</td>
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<tr>
<td>BIT 150</td>
<td>California Energy Code – Building Energy Efficiency Standards (3)</td>
<td></td>
</tr>
<tr>
<td>CONST 143</td>
<td>Photovoltaic Systems (3)</td>
<td></td>
</tr>
<tr>
<td>ECON 306</td>
<td>Environmental Economics (3)</td>
<td></td>
</tr>
<tr>
<td>GEOG 302</td>
<td>Environmental Studies &amp; Sustainability (3)</td>
<td></td>
</tr>
<tr>
<td>GEOG 305</td>
<td>Global Climate Change (3)</td>
<td></td>
</tr>
<tr>
<td>GEOG 306</td>
<td>Weather and Climate (3)</td>
<td></td>
</tr>
<tr>
<td><strong>Total Units:</strong></td>
<td></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

Upon completion of this program, the student will be able to:

- PSLO 1: Establish meaningful ethical, social and environmental objectives for buildings and communities based on the values of energy and resource conscious design.
- Compare and contrast societal and economic impacts of utilizing renewable and non-renewable energy sources.
- Compare and contrast the effect of contextual issues and evaluate their impact on energy consumption, environment and the beneficial experience of interior and exterior spaces.
- PSLO 2: Identify and articulate issues related to the choice of various building, landscape and environmental systems; ideate responsive solutions; and compare the alternatives in making effective, sustainable decisions.
- Analyze and calculate energy use to make informed, environmentally-sound and economic choices to satisfy human needs for comfort and aesthetics.
- Explain the concepts of resource conservation and waste reduction and make sustainable design choices related to materials and construction.
- Develop a comprehensive understanding of green rating systems, livable communities strategies and the ability to apply these concepts in decision-making.
- PSLO 3: Demonstrate independent learning, teamwork and continuing education habits that will help to encourage a life long pursuit of knowledge.
- To use a team work process to identify issues, analyze criteria, research and apply learned principles to synthesize solutions to specific design projects.
- To demonstrate habits of visual note making and independent research by developing a sketch and notebook to record learning.

Career Information

This certificate helps to develop the knowledge base related to sustainable green buildings and environments for the careers of architecture, construction, construction management, building inspection, horticulture, landscape architecture and architectural design technology.

Solar Installers Certificate

The Solar Installers Certificate program is designed to quickly prepare students for jobs installing solar panels in the solar industry. Our focus is to blend the academic rigor of the classroom, with the hands on training that entry level solar installers need to be successful in the industry. The certificate is a fast paced blend of our introductory course for the construction industry, OSHA 10 Hour Safety certification, and two courses in solar photovoltaics, that culminate with national certification exam preparation and job placement assistance.

Catalog Date: January 1, 2022

Certificate Requirements

<table>
<thead>
<tr>
<th>COURSE CODE</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CONST 102</td>
<td>Introduction to Construction Practices</td>
<td>4</td>
</tr>
<tr>
<td>CONST 103</td>
<td>OSHA 10 Hour Safety Training</td>
<td>1</td>
</tr>
<tr>
<td>CONST 143</td>
<td>Photovoltaic Systems</td>
<td>3</td>
</tr>
<tr>
<td>CONST 145</td>
<td>Advanced Solar Photovoltaic Systems</td>
<td>3</td>
</tr>
<tr>
<td>Total Units</td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

Enrollment Eligibility

To be eligible for enrollment in the program, the student must meet the following criteria:

- Students should have the physical ability to lift 40 pounds, and the desire to work on both roof top and ground mount solar arrays.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- PSLO #1 Define the role that safety plays in the construction industry, with an emphasis on hazard recognition and regulatory compliance for solar installers.
- Demonstrate safe working practices with the tools and duties associated with solar panel installations.
- PSLO #2 Summarize the common career paths in the solar industry, and articulate the standard entry level expectations for those careers.
- PSLO #3 Define and describe the purpose and function of the major components in a typical photovoltaic solar system.
- Analyze the difference between grid tied PV systems and those PV systems with on site storage.
- PSLO #4 Demonstrate proficiency in system design and system sizing.
- Show knowledge of site survey, load analysis, system losses, and utility interconnection requirements.
- PSLO #5 Summarize system commissioning and system maintenance.
- Identify regularly used electrical test equipment and the typical performance parameters that are commonly monitored for PV solar systems.

Career Information

Solar installer, Crew leader, Solar sales, System designer, Estimator, Project manager, Safety manager, Solar trainer.

Construction (CONST) Courses

CONST 102 Introduction to Construction Practices

| Units: | 4 |
| Hours: | 54 hours LEC; 54 hours LAB |
| Prerequisite: | None |
| Catalog Date: | January 1, 2022 |

This course provides students with in-depth analysis of the organization and structure of the construction industry and the many career choices the industry offers. Many of the construction trades are represented, with formal apprenticeship opportunities highlighted. The emerging “Green Building” jobs will be examined, as well as other topics in sustainability. Guest speakers and field trips provide the students a wide view of the expectations of entry-level work, wages, benefits, and work place culture. The curriculum also emphasizes job site safety, practical working knowledge of tool and equipment use, an introduction to blueprints, and an overview of industry math.
CONST 103 OSHA 10 Hour Safety Training

This OSHA Outreach Training Program is for training construction students and industry workers in basic safety and health hazard recognition and prevention. This course is taught by authorized industry outreach trainers, and successful students will receive the OSHA 10 Hour card. Topics include: Intro to OSHA, Fall Protection, Electrical, Ladders and Stairs, Scaffolds, PPE, Hand and Power Tools, Hazcom, Motor Vehicles, Confined Space Entry, Fire Protection, and Ergonomics.

Units: 1
Hours: 18 hours LEC
Prerequisite: None.
Catalog Date: January 1, 2022

CONST 105 Rough Carpentry I - Tools, Materials, and Foundations

This course is designed to teach the introductory skills required to be successful in the construction industry. Course topics include an Introduction to the Industry, Hand and Power Tools, Building Materials, Introduction to Plans and Building Codes, Site Layout and Foundations. A heavy emphasis is placed on “hands on” demonstration of proficiency with safe and efficient use of tools, plan reading, as well as the fundamental layout techniques for foundations.

Units: 3
Hours: 27 hours LEC; 81 hours LAB
Prerequisite: None.
Catalog Date: January 1, 2022

CONST 106 Rough Carpentry II - Floors, Walls, and Roof Framing

This course is designed to teach the skills required to be successful in the construction industry. Course topics include Skill Development in Hand and Power Tool use, as well as techniques in Floor Framing, Wall Framing and Roof Framing. A heavy emphasis is placed on “hands-on” demonstration of proficiency with safe and efficient use of tools, plan reading, as well as the fundamental layout techniques for floor, wall, and roof framing.

Units: 3
Hours: 27 hours LEC; 81 hours LAB
Prerequisite: None.
Catalog Date: January 1, 2022

CONST 107 Rough Carpentry III - Exterior Finishes

This course is designed to teach the skills required to be successful in the construction industry. Course topics include skill development for hand and power tools, review of framing principles, windows and doors, insulation and ventilation, exterior siding, and roofing. A heavy emphasis is placed on “hands-on” demonstration of proficiency with safe and efficient use of tools, window and door installations, as well as siding and roofing.

Units: 3
Hours: 27 hours LEC; 81 hours LAB
Prerequisite: None.
Catalog Date: January 1, 2022

CONST 108 Finish Carpentry I - Interior Finish

This course is designed to teach the skills required to be successful in the construction industry. Course topics include Skill development with tools, Drywall, Interior doors and door frames, Interior trim, Stairs and cabinets. A heavy emphasis is placed on “hands-on” demonstration of proficiency with safe and efficient use of tools, drywall applications, as well as the accurate installation of interior trim.

Units: 3
Hours: 27 hours LEC; 81 hours LAB
Prerequisite: None.
Catalog Date: January 1, 2022

CONST 142 Energy, Performance, and Indoor Air Quality

This course is intended to be the third in the series of Green Building courses, although the sequence is not mandatory. Each course in the series focuses on specific pieces of the larger Green Building sector. This course covers the following topics: The science of energy and its sources, as well as the common alternative and renewable sources of energy that are being researched and developed. Green building guidelines and state energy efficiency standards for buildings and appliances will also be examined. The "Whole House approach" to Building Performance will be an under-current through out the course. Indoor Air Quality, and other health topics will be introduced. This course satisfies the elective units for the CRC Green Building Certificate.

Units: 3
Hours: 54 hours LEC
Prerequisite: None.
Catalog Date: January 1, 2022

CONST 143 Photovoltaic Systems

This course will cover general solar industry topics with an emphasis photovoltaic principles and products. There will be a brief study of the political landscape in California in support of the California Solar Initiative, and market strategies and incentives will also be discussed. There will be some hands on projects to help students learn basic electrical theory and circuits.

Units: 3
Hours: 54 hours LEC
Prerequisite: None.
Catalog Date: January 1, 2022
and an introduction to print reading. System Sizing and components will be covered as well. This class is part of the Green Buildings: Environmental Design, Energy Management and Performance Based Construction Certificate.

CONST 145 Advanced Solar Photovoltaic Systems

Units: 3
Hours: 45 hours LEC; 27 hours LAB
Prerequisite: CONST 143 with a grade of "C" or better
Catalog Date: January 1, 2022

This course reviews basic solar PV system basics, and will continue deeper into concepts in system sizing and wiring, utility interconnection requirements and policies, commissioning, maintenance and troubleshooting, economic analysis and business models, and will conclude with preparation for an external industry certification examination.

CONST 160 Introduction to Residential Building Performance

Units: 6
Hours: 81 hours LEC; 81 hours LAB
Prerequisite: None.
Catalog Date: January 1, 2022

This class focuses on preparing students for jobs within the Residential Building Performance and Weatherization industries. This class will train students in residential building science, energy efficiency, and combustion appliance safety. Topics will include nationally recognized Building Performance Institute standards and California Weatherization Installation Standards, Duct and Shell Sealing Measures, and Combustion Appliance Zone testing. This is the first course in the Residential Building Performance and Energy Assessment certificate.

CONST 161 Intermediate Residential Building Performance and Energy Auditing

Units: 4
Hours: 54 hours LEC; 54 hours LAB
Prerequisite: CONST 160 with a grade of "C" or better
Catalog Date: January 1, 2022

This course focuses on preparing students for jobs in the Building Performance and Residential Energy Assessment industry. This class will train students about current auditing methods and standards including inspection, whole house performance diagnostics, building science, software applications for the energy professional, utility fee structure and bill disaggregation, and the industry's recognized rating systems. This course will also prepare the student for the Building Performance Institute "Building Analyst" exam.

CONST 163 Advanced Energy Auditing and Energy Modeling

Units: 3
Hours: 54 hours LEC
Prerequisite: CONST 161
Advisory: None.
Catalog Date: January 1, 2022

This course prepares students for jobs in the building performance and energy auditing industry. This class will train students in advanced energy auditing techniques using energy modeling software, and thermography. Students will be trained to use energy modeling software recognized by the California Energy Commission for both new and existing structures. Students will also be trained to use infrared imaging for accurate, non-invasive inspection of homes, assisting the auditor in locating thermal bridging in the building envelope. Topics in Multifamily and "Envelope Professional" certification will also be discussed.

CONST 294 Topics in Green Building Technology

Units: 0.5 - 4
Hours: 9 - 54 hours LEC
Prerequisite: None.
Catalog Date: January 1, 2022

This course covers special topics not included in current green building classes. Topics may be offered in workshops or seminar presentations on timely subjects or targeted for specific audiences.

CONST 298 Work Experience in Construction

Units: 0.5 - 4
Hours: 30 - 300 hours LAB
Prerequisite: None.
Enrollment Limitation: Students must be in a paid or unpaid internship, volunteer position or job related to career goals in Construction.
General Education: AA/AS Area III(b)
Catalog Date: January 1, 2022

This course provides students with opportunities to develop marketable skills in preparation for employment in their major field of study or advancement within their career. It is designed for students interested in work experience and/or internships in associate degree level or certificate occupational programs. Course content includes understanding the application of education to the workforce; completion of required forms which document the student's progress and hours spent at the work site; and developing workplace skills and competencies. Appropriate level learning objectives are established by the student and the employer. During the semester, the student is required to participate in a weekly orientation and 37.5 hours of related paid work experience, or 30 hours of unpaid work experience for 0.5 unit. An additional 37.5 or 30 hours of related work experience is required for each additional 0.5 units. Students may take up to 16 units total across all Work Experience course offerings. This course may be taken up to four times when there are new or expanded learning objectives. Only one Work Experience course may be taken per semester.
This class focuses on preparing students for jobs within the weatherization industry. This class will train students in Weatherization Installation Standards, Duct and Shell Sealing Measures, and Combustion Appliance Safety. Students enrolled in Construction 299-Weatherization Standards, will sign up with the Sacramento Employment Training Agency, and receive funding for tools, books, and other support services, including job placement services, upon successful completion of the course, and an endorsement from the instructor.

**Units:** 5
**Hours:** 72 hours LEC; 54 hours LAB
**Prerequisite:** None.
**Catalog Date:** January 1, 2022