CONSTRUCTION AND ENERGY TECHNOLOGY

Contact Information

Division
Business and Technology

Dean
Amy Schulz

Associate Dean
Darlene Jackson

Division Office
B 3, Rocklin Campus

Overview

The Construction and Energy Technology curriculum is designed to give students a broad knowledge of the construction and energy industries. Coursework includes job safety, construction skills, work ethics and hands-on laboratory courses to provide trade related skills such as electrical, plumbing, carpentry and photovoltaics. The program provides foundational training for construction management programs as well as training for entry-level employment in the construction industries. The energy and photovoltaics courses provide the fundamental skills needed to excel in an energy sector career. In addition to degree and transfer opportunities, skills certificates are available in the field of photovoltaics.

Construction and Energy Technology Advisory Committee

• Jeff Bailey, Instructor, Roseville High School
• Phil Barnes, Manager, Energy Home Performance, Rocklin
• Jim Bayless, Treasure Homes
• Jon Bertolino, Sacramento Municipal Utility District
• Michelle Bertolino, Roseville Electric
• Jedediah Biagi, Plan It Solar
• Anna Bousouris, Sierra Solar
• Julia Burrows, Valley Vision
• Peter Davis, ATTEI
• Michael Dela Pena, Greentern
• Steve Dolan, Instructor, Roseville High School
• Brett Dotson, SMA-America
• Cheryl Gibson, President, Von-Jac Development, Inc.; Board Member, Placer County Contractors Association, Auburn
• Jim Gragg, SOLARReCITY Electric
• John Hill, Sierra Solar
• Brian Hurd, Hands On Solar
• Darrell Johnson, Pacific Gas and Electric
• Devan Johnson, KW Engineering
• Sue Kateley, CalSEIA
• Rick Larkey, Director, Workforce Development, North State Building Industry Association, Roseville
• Richard Lindstadt, Foresthill High School
• Sue Lunsford, Foresthill High School
• Barbie Lussier-Davis, Owner, Mission West Builders, Cameron Park

• Gil Mathew, Sierra Solar
• Derek Ogden, City of Roseville
• John Orr, Program Consultant, North State Building Industry Association, Roseville
• Steve Paris, Instructor, Del Oro High School, Loomis
• Patrick Remington, Owner, Remington Construction, Auburn
• Jonathan Schwartz, Instructor, Colfax High School
• David Schweickert, Co-owner, Capital City Solar, Roseville
• Erika Schweickert, Co-owner, Capital City Solar, Roseville
• Terry Seabury, Executive Director and CEO, Goweka Solutions, Sacramento
• Terri Shirhall, City of Roseville
• Sam Vanderhoof, Pacific Renewables Group
• Martin Webb, Plan It Solar
• David Weld, Instructor, Oakmont High School, Roseville
• Susan Wheeler, Coordinator, Education Relations, Sacramento Municipal Utility District
• Dan Zeisler, Principal, Chicago Park

Degrees/Certificates

Associate Degrees
Construction Management (p. 1)

Skills Certificates
Construction Basics (p. 2)

Noncredit Certificates Energy Surveying and Lighting Retrofits (p. 2)

Construction Management

AS Degree

The curriculum in Construction Management focuses on providing a broad base of knowledge and skills targeted toward the management of construction operations. The objective of the degree is to provide a foundation for continued study in construction management at a four-year college or university or for employment in the construction industry. The program is oriented toward the practical problems of the construction industry and the curriculum emphasizes subject areas that provide a basis for employment in the industry including business, mathematics and foundational construction courses. Students completing the Construction Management program will find a wide variety of career choices including estimator, construction manager, construction owner, and project manager. For the degree, students must fulfill the following major requirements with grades of “C” or better, complete a minimum of 60 degree-applicable semester units (12 of which must be completed at Sierra College) with a grade point average of at least 2.0, and complete one of the following three general education patterns:

• Sierra College Associate Degree Requirements (http://catalog.sierracollege.edu/student-resources/general-education/associate-degree-requirements);
• California State University General Education Breadth (http://catalog.sierracollege.edu/student-resources/general-education/california-state-university-general-education-breadth-requirements) pattern;
• Intersegmental General Education Transfer Curriculum (IGETC) (http://catalog.sierracollege.edu/student-resources/general-education/intersegmental-general-education-transfer-curriculum-igetc).
Required Courses

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>CET 0001</td>
<td>OSHA Construction Safety Training</td>
<td>1</td>
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<tr>
<td>CET 0005</td>
<td>Introduction to the Built Environment</td>
<td>3</td>
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<td>CET 0020</td>
<td>Foundations and Framing</td>
<td>3</td>
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<td>CET 0022</td>
<td>Introduction to Energy Efficiency Construction</td>
<td>3</td>
</tr>
<tr>
<td>BUS 0001</td>
<td>Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>BUS 0002</td>
<td>Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>BUS 0003</td>
<td>Managerial Accounting</td>
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<tr>
<td>ECON 0001A</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 0001B</td>
<td>Principles of Microeconomics</td>
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<tr>
<td>MATH 0016A</td>
<td>Calculus for Social and Life Sciences</td>
<td>4</td>
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<tr>
<td>MATH 0030</td>
<td>Analytical Geometry and Calculus I</td>
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<td>PHYS 0105</td>
<td>General Physics I</td>
<td>4</td>
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<tr>
<td>PHYS 0105L</td>
<td>General Physics I Laboratory</td>
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<td>Total Units</td>
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Construction Basics

Skills Certificate

The Construction Basics Skills Certificate curriculum prepares students to work safely for small to large home builders in a labor role. This skills certificate provides a foundation for students to help employers directly build residential homes. A skills certificate is designed to provide career technical skills; it is not equivalent to an associate degree.

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<tr>
<td>CET 0001</td>
<td>OSHA Construction Safety Training</td>
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</tr>
<tr>
<td>CET 0003</td>
<td>Introduction to Construction and CNC Woodworking</td>
<td>3</td>
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<tr>
<td>CET 0005</td>
<td>Introduction to the Built Environment</td>
<td>3</td>
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<tr>
<td>Total Units</td>
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Energy Surveying and Lighting Retrofits

Noncredit Certificate of Completion

The Construction and Energy Technology noncredit Certificate of Completion prepares students to work for businesses in residential and commercial energy auditing, electrical wiring and commercial lighting retrofit trade industries.

Required Courses

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>CET 0800</td>
<td>Introduction to Energy Surveying</td>
<td>0</td>
</tr>
<tr>
<td>CET 0801</td>
<td>Basic Electricity and Wiring Fundamentals</td>
<td>0</td>
</tr>
<tr>
<td>CET 0802</td>
<td>Introduction to Lighting Retrofits</td>
<td>0</td>
</tr>
<tr>
<td>Total Units</td>
<td>0</td>
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</tbody>
</table>

Courses

Understanding course descriptions (http://catalog.sierracollege.edu/student-resources/course-information/understanding-course-descriptions)
CET 0022. Introduction to Energy Efficiency Construction

Units: 3
Formerly known as CTR 44
Hours: 108 (36 lecture, 72 laboratory)
Fundamentals of residential framing both conventional and green energy efficient techniques involving layout and construction to include: exterior and interior walls, ceilings, roof systems, stair designs and installation. Major lab project: framing a project in the community. Includes use and practices of materials and codes related to California Green Technology and "Net Zero Energy" policies. (CSU)

CET 0024. Fundamentals of Construction Documents and Estimating

Units: 3
Formerly known as CTR 47 and 48
Hours: 54 lecture
Establishes a vocabulary and understanding of construction related documents including the symbols and detail views of building plans. Cost estimating to include material and labor cost calculations, specifications, problem solving, and bid preparations. (CSU)

CET 0026. Residential House Wiring and Codes

Units: 3
Formerly known as CTR 60
Hours: 108 (36 lecture, 72 laboratory)
Instruction basic to the electrical wiring trade. Inside wiring as applied to residential structures. Electrical service requirements for photovoltaic systems. Use of tools and materials of the trade. Review of the National Electrical Code and the applications and NEC updates due to California Green Technology and "Net Zero Energy" policies. (CSU)

CET 0028. Independent Study

Units: 1-3
Formerly known as CTR 28
Designed for students interested in furthering their knowledge at an independent study level in an area where no specific curriculum offering is currently available. Independent study might include, but is not limited to, research papers, special subject area projects, and research projects. See Independent Study page in catalog. (CSU)

CET 0030. Finish Carpentry

Units: 3
Formerly known as CTR 41
Advisory: Completion with grade of "C" or better or concurrent enrollment in CET 3
Hours: 108 (36 lecture, 72 laboratory)
Fundamentals of woodworking hand tools, power hand tools and woodworking machinery to safely develop knowledge and skills leading to finish trim carpentry. Emphasis on residential construction finish carpentry standards, details, nomenclature, trims, and methods of setting interior and exterior doors, window jamb and trims, closet packs, cabinet installs, wainscoting, stair trim and railings, base and ceiling trims and finished flooring applications. (not transferable)

CET 0032. Residential Building Codes

Units: 3
Formerly known as CTR 52
Hours: 54 lecture
Instruction in building codes for light frame one- or two-story dwellings related to local jurisdictions and the State of California. Application of codes to existing buildings with a study of regulations and abatement procedures for standard frame and ICF green technology buildings. Includes codes related to California Green Technology and "Net Zero Energy" policies. (not transferable)

CET 0034. Plumbing Installation and Design

Units: 3
Formerly known as CTR 62
Hours: 108 (36 lecture, 72 laboratory)
Planning, installing, and maintaining simple waste, water and gas plumbing systems in accordance with good practice and in conformity to local codes and ordinances. Overview of new plumbing techniques. Includes use of materials and codes related to California Green Technology and "Net Zero Energy" policies. (CSU)

CET 0040. Beginning Photovoltaic Systems

Units: 4
Formerly known as ESS 30
Advisory: Completion with grade of "C" or better or concurrent enrollment in CET 1
Hours: 108 (54 lecture, 54 laboratory)
Introduction to photovoltaic concepts, applications, and the solar energy industry. Includes basics of electricity, load estimation, energy efficiency, solar site assessment, photovoltaic system components, sizing, financial analysis, design, installation concepts, and maintenance. This course taken with CET 42 prepares students to sit for the NABCEP PV Entry Level Certificate of Knowledge exam. (CSU)

CET 0042. Intermediate Photovoltaic Systems

Units: 4
Formerly known as ESS 32
Prerequisite: Completion of CET 40 with grade of "C" or better
Hours: 108 (54 lecture, 54 laboratory)
Expands on the fundamentals of photovoltaics with a focus on system design and installation concepts of grid-connected residential and small commercial systems. Topics include detailed system sizing, array layout, mounting on various roof constructions, mechanical and electrical integration as well as related electrical codes and workplace safety standards. This course, taken with CET 40, prepares students to sit for the NABCEP PV Entry Level Certificate of Knowledge exam. (CSU)

CET 0044. Advanced Photovoltaic Systems

Units: 4
Formerly known as ESS 34
Prerequisite: Completion of CET 42 with grade of "C" or better
Hours: 108 (54 lecture, 54 laboratory)
Examines the theoretical and technical dimensions of photovoltaic (PV) systems in detail. Topics include advanced principles of electricity and how they apply to PV systems, commissioning, troubleshooting, net metering laws, local codes, and National Electric Code PV requirements. Off campus activities required. (CSU)

CET 0046. Solar Photovoltaic Sales

Units: 3
Advisory: Completion with grade of "C" or better or concurrent enrollment in CET 40
Hours: 54 lecture
Introduction to photovoltaic sales concepts and the solar energy industry. Includes basics of photovoltaic marketing, sales, incentives, site usage, site assessment, photovoltaic system components, system sizing, financial analysis, and sales communication techniques. (not transferable)
CET 0047. Introduction to Energy Surveying
Units: 4
Hours: 108 (54 lecture, 54 laboratory)
Competency-based course of instruction designed to align with the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) Level-1 energy auditing standards. Provides students with hands-on experience in residential and commercial energy auditing. Emphasis on principles and sources of energy, detailed facilities evaluation techniques, data collection for energy auditing, establishing baselines, and conducting accurate inventories. Includes workplace safety policies and practices to comply with OSHA guidelines. (not transferable)

CET 0050. Interior and Exterior Finishing
Units: 3
Formerly known as CTC 24 or CTR 24
Hours: 108 (36 lecture, 72 laboratory)
Focus on removal and preparation of existing and new finishes, sanding, masking, caulking, applications of stains, shellac, varnishes and lacquers, interior and exterior painting with primers and paint, use of brushes, rollers and spray systems, HVLP and airless. (not transferable)

CET 0060. Production Cabinetry (Traditional)
Units: 3
Formerly known as CTC 5 or CTR 5
Advisory: Completion with grade of "C" or better or concurrent enrollment in CET 3
Hours: 108 (36 lecture, 72 laboratory)
Economy and custom grade conventional case construction revolving around industrial standards, joinery, processes, structures and hardware of residential case structural systems. Also includes computer-aided spatial designs. Lab work shall be instructor-initiated case structures for a residential project. (not transferable)

CET 0070A. Advanced Skill and Speed Development - Concrete
Units: 3
Formerly known as CTR 37A
Prerequisite: Completion with grade of "C" or better or concurrent enrollment in CET 20
Hours: 108 (36 lecture, 72 laboratory)
Designed to provide an advanced level of skill, speed, and experience for concrete students. Continued in-depth study of materials acquisition, scheduling, detailed layouts, forming for foundations or other applications using concrete as a base. Uses extensive problem solving in the completion of a department selected project. (not transferable)

CET 0070B. Advanced Skill and Speed Development - Framing
Units: 3
Formerly known as CTR 37B
Prerequisite: Completion with grade of "C" or better or concurrent enrollment in CET 0020 or 0022
Hours: 108 (36 lecture, 72 laboratory)
Designed to provide an advanced level of skill, speed, and experience for framing students. Continued in-depth study of materials acquisition, scheduling, detailed layouts for framing structures, to include floors, walls, rooms, and roofs. Uses extensive problem solving in the completion of a department-selected project. (not transferable)

CET 0070C. Skill and Speed Development-Cabinetry and Furniture
Units: 3
Formerly known as CTC 35 or CTR 38
Prerequisite: Completion with grade of "C" or better or concurrent enrollment in CET 3
Advisory: Completion of CET 60 with grade of "C" or better
Hours: 108 (36 lecture, 72 laboratory)
Designed to further develop skill, speed, and experience capabilities to advance knowledge in construction technology. In-depth study of architectural woodwork standards; extensive problem solving in student-selected laboratory projects. (not transferable)

CET 0095. Internship in Construction and Energy Technology
Units: 0-4
Formerly known as CTR 95
Designed for advanced students to work in an area related to their educational or occupational goal. Provides new on-the-job technical training under the direction of a worksite supervisor, allowing students to expand knowledge and skills in the chosen field. Mandatory orientation session and faculty approval to determine eligibility. Students may earn up to a total of 16 units in internship courses (any course numbered 95 and PDEV 94). (CSU-with unit limitation)

CET 0800. Introduction to Energy Surveying
Units: 0
Prerequisite: Completion of CET 1 with grade of "C" or better, or equivalent as determined by the program chair
Hours: 40 (24 lecture, 16 laboratory)
Competency-based course of instruction designed to align with the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) Level-1 energy auditing standards. Provides hands-on experience in residential and commercial energy auditing. Emphasis on principles and sources of energy, detailed facilities evaluation techniques, data collection for energy auditing, establishing baselines, and conducting accurate inventories. Includes workplace safety policies and practices to comply with OSHA guidelines. Students required to secure personal protective equipment as of first class session. (pass/no pass grading) (noncredit)

CET 0801. Basic Electricity and Wiring Fundamentals
Units: 0
Prerequisite: Completion of CET 800 with grade of "Pass"
Hours: 40 (20 lecture, 20 laboratory)
This comprehensive introduction to electrical wiring provides a well-rounded understanding of the fundamentals of basic electricity, electrical safety, electrical circuitry, and the processes and procedures of the electrical wiring trades. Includes relevant electrical codes. Students required to secure personal protective equipment as of first class session. (pass/no pass grading) (noncredit)

CET 0802. Introduction to Lighting Retrofits
Units: 0
Prerequisite: Completion of CET 801 with grade of "Pass"
Hours: 40 (20 lecture, 20 laboratory)
Provides well-rounded competency-based understanding of lighting retrofit trade fundamentals through hands-on experience in commercial retrofit procedures and skills. Includes electrical safety, policies, and practices as relate to retrofit work. Students required to secure personal protective equipment as of first class session. (pass/no pass grading) (noncredit)
CET 0804. Rapid Prototyping for Product Design

*Units: 0*

*Hours: 18 (9 lecture, 9 laboratory)*

Hands-on exposure to processes used to fabricate prototypes. An introduction to tools and technologies for prototyping, including design for manufacture. Example products show the process from idea to market including the series of prototypes that helped get the product to successful sales. Course materials cover safe hand tool use, power woodworking hand tools, wood shop tools, laser cutting, and CNC routers.

(pass/no pass grading) (noncredit)

**Program Student Learning Outcomes (PSLOs)**

- Demonstrate a fundamental understanding of the construction and energy industries and identify career pathways and opportunities.
- Identify code compliant construction.
- Demonstrate safety compliance in the construction and energy industries.
- Utilize fundamental building principles to lay out and construct structures and systems.
- Explain the principles of Green Building and prescribe building solutions utilizing emerging technology.