



El Camino College
COURSE OUTLINE OF RECORD – Official

Course Acronym:	CTEC
Course Number:	131
Descriptive Title:	Roof Framing
Division:	Industry and Technology
Department:	Construction Technology
Course Disciplines:	Construction Technology
Catalog Description:	This is an advanced course in construction technology, covering residential roof framing. Topics of instruction include roof structures, calculation and layout of various rafters, California Building Code (CBC) requirements, roof construction and estimating. Practical instruction is given in the use of tools and materials through construction laboratory work.
Prerequisite:	Construction Technology 100 or Construction Technology 110 with a minimum grade of C or equivalent
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	2.5
Hours Laboratory (per week):	5
Outside Study Hours:	5
Total Course Hours:	135
Course Units:	4
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	Spring 2002
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	
CSU GE:	
Term:	

	Other:	
	IGETC:	
	Term:	
	Other:	
Student Learning Outcomes:	SLO #1 Roof Framing Materials and Methods Students will be able to demonstrate a basic application of materials and methods commonly used in residential construction. SLO #2 Roof Slope Students will be able to calculate roof slope. SLO #3 Valley Rafter Dimensions Students will be able to calculate the dimensions of a valley rafter.	
Course Objectives:	1. Diagram dimensioned roof plans in various scales. 2. Compute both the mathematical and actual lengths of ridges, common rafters, hip and valley rafters, jacks and cripple jack rafters. 3. Layout, cut and construct roof systems containing common rafters, hip and valley rafters, jacks and cripple jack rafters. 4. Identify and define the terms span, run and cut; describe their relationship to one another. 5. Perform a quantity survey of roof framing materials. 6. Layout, cut and install fascia and verge boards, including inside and outside corners. 7. List the CBC minimum requirements for residential roof framing systems. 8. Describe the standard materials, methods, dimensions and procedures associated with the construction of residential roof framing systems.	
Major Topics:	I. OVERVIEW OF ROOF FRAMING (5 hours, lecture) A. Safety instructions B. Project requirements II. OVERVIEW OF ROOF FRAMING (10 hours, lab) A. Safety test B. Tour of lab 1. Material storage 2. Building sites 3. Safety equipment 4. Large tool storage C. Toolroom III. ROOF DESIGN (10 hours, lecture) A. Roof styles B. Functions	

- C. Roof plan view and elevations
- D. Right triangle relationships
- E. Roof framing nomenclature
- F. CBC roof requirements
- G. Plate layout for rafters

IV. ROOF DESIGN (20 hours, lab)

- A. Roof styles
- B. Functions
- C. Roof plan view and elevations
- D. Right triangle relationships
- E. Roof framing nomenclature
- F. CBC roof requirements
- G. Plate layout for rafters

V. RAFTER LAYOUT AND ROOF CONSTRUCTION (25 hours, lecture)

- A. Review of rafter tables and step-off method for common and hip layout
- B. Equations for run, cut and rise
- C. Finding the mathematical line length of rafters by use of the Pythagorean Theorem
- D. Deductions for intersections on members
- E. Layout for: ridge, common, hip, valley and jack rafters
- F. Tripod method for hip roof construction
- G. Gable studs, varied plate heights, roof bracing
- H. Fascia, verge, eave boards, and roof sheathing
- I. Open beam roof construction
- J. Dutch gable and "California Valley"

VI. RAFTER LAYOUT AND ROOF CONSTRUCTION (50 hours, lab)

- A. Review of rafter tables and step-off method for common and hip layout
- B. Equations for run, cut and rise
- C. Finding the mathematical line length of rafters by use of the Pythagorean Theorem
- D. Deductions for intersections on members
- E. Layout for: ridge, common, hip, valley and jack rafters
- F. Tripod method for hip roof construction
- G. Gable studs, varied plate heights, roof bracing
- H. Fascia, verge, eave boards, and roof sheathing
- I. Open beam roof construction
- J. Dutch gable and "California Valley"

VII. ROOF ESTIMATING (5 hours, lecture)

- A. Estimating roof framing members
- B. Estimating roofing materials

VIII. ROOF ESTIMATING (10 hours, lab)

	A. Estimating roof framing members B. Estimating roofing materials
Total Lecture Hours:	45
Total Laboratory Hours:	90
Total Hours:	135
Primary Method of Evaluation:	3) Skills demonstration
Typical Assignment Using Primary Method of Evaluation:	Prepare a one-page quantity survey for a hip roof system. Submit survey to the instructor.
Critical Thinking Assignment 1:	Determine the mathematical and actual lengths of common, hip, valley and jack rafters. Calculate the amounts on a one-page document. Layout and cut rafters. Consult instructor for evaluation.
Critical Thinking Assignment 2:	Given a roof plan, layout and construct a roof system containing common, hip, valley, jack and cripple jack rafters. Consult instructor for evaluation.
Other Evaluation Methods:	Class Performance Completion Matching Items Multiple Choice Performance Exams True/False Written Homework
Instructional Methods:	Demonstration Guest Speakers Lab Lecture Multimedia Presentations
If other:	
Work Outside of Class:	Problem solving activity Required reading Study Written work (such as essay/composition/report/analysis/research)
If Other:	

Up-To-Date Representative Texts:	Leonard Koel. <u>CARPENTRY</u> . 7th ed. American Technical Publishers, 2021 A. F. Reichers. <u>FULL LENGTH ROOF FRAMER</u> . A. F. Reichers Publishers, 1995. Discipline Standard
Alternative Texts:	
Required Supplementary Readings:	
Other Required Materials:	Pocket calculator Architectural scale Safety glasses Carpenter's nailing apron Appropriate shoes and attire for construction work
Requisite:	Prerequisite
Category:	sequential
Requisite course(s): List both prerequisites and corequisites in this box.	Construction Technology 100 or Construction Technology 110
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	Ability to use hand tools and hand-held power tools in residential construction work. CTEC 100 - Construct a standard height wall including doors and windows. CTEC 100 - Step-off rafter lengths using a framing square. CTEC 100 - Construct a gable roof structure. CTEC 100 - Identify and use hand tools common to the construction industry. CTEC 100 - Identify and use hand held power tools common to the construction industry. CTEC 110 - Mix, place and finish a concrete slab. CTEC 110 - Identify and define a list of construction terms. CTEC 110 - Identify and use hand tools and handheld power tools common to the construction industry. Command of construction nomenclature. CTEC 100 - Calculate header and cripple lengths for standard doors and windows. CTEC 100 - Compute rafter lengths.

	CTEC 100 - Identify components in a structural Type V residential.
	CTEC 100 - Identify and define a list of construction terms.
	CTEC 100 - Identify and use hand tools common to the construction industry.
	CTEC 100 - Identify and use hand held power tools common to the construction industry.
	CTEC 110 - Identify structural framing members.
	CTEC 110 - Identify and define a list of construction terms.
	CTEC 110 - Identify and use hand tools and handheld power tools common to the construction industry.
	CTEC 110 - Interpret architectural blueprints.
	CTEC 110 - Identify and analyze the procedures for submission of a building permit application.
	Knowledge of construction materials and methods.
	CTEC 100 - Calculate header and cripple lengths for standard doors and windows.
	CTEC 100 - Construct a standard height wall including doors and windows.
	CTEC 100 - Identify components in a structural Type V residential.
	CTEC 100 - Compute rafter lengths.
	CTEC 100 - Step-off rafter lengths using a framing square.
	CTEC 100 - Construct a gable roof structure.
	CTEC 100 - Identify and use hand tools common to the construction industry.
	CTEC 100 - Identify and use hand held power tools common to the construction industry.
	CTEC 110 - Mix, place and finish a concrete slab.
	CTEC 110 - Determine quantities of concrete needed for various concrete pours.
	CTEC 110 - Identify structural framing members.
	CTEC 110 - Identify and define a list of construction terms.
	CTEC 110 - Identify and use hand tools and handheld power tools common to the construction industry.
	CTEC 110 - Interpret architectural blueprints.
	CTEC 110 - Prepare and dimension a floor plan.

	CTEC 110 - Identify and analyze the procedures for submission of a building permit application.
Requisite Skill:	Or equivalent
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	If a student has taken Construction Technology 100 or Construction Technology 110 at another college or has experience in building fundamentals or additions and remodeling, they will be prepared to enroll in this course. If students do not have some form of construction building experience, they will not succeed in this course.
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Tim Meza
Date:	02/01/2001
Original Board Approval Date:	03/19/2001
Last Reviewed and/or Revised by:	Ross Durand
Date:	05/01/2025
Last Board Approval Date:	06/26/2025
Effective Term:	FA 2026