



El Camino College  
COURSE OUTLINE OF RECORD – Official

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| <b>Course Acronym:</b>              | CTEC   |
| <b>Course Number:</b>               | 121  |
| <b>Descriptive Title:</b>           | Concrete and Formwork  |
| <b>Division:</b>                    | Industry and Technology  |
| <b>Department:</b>                  | Construction Technology  |
| <b>Course Disciplines:</b>          | Construction Technology  |
| <b>Catalog Description:</b>         | This is a course in construction technology, covering concrete and formwork. Topics of instruction include the California Building Codes (CBC) requirements, construction mathematics, house layout, blueprint reading, formwork, use of leveling instruments and estimating. Practical instruction is given in the use of tools and materials through construction laboratory work. |
| <b>Prerequisite:</b>                |  |
| <b>Co-requisite:</b>                |  |
| <b>Recommended Preparation:</b>     |  |
| <b>Enrollment Limitation:</b>       |  |
| <b>Hours Lecture (per week):</b>    | 2.5  |
| <b>Hours Laboratory (per week):</b> | 5  |
| <b>Outside Study Hours:</b>         | 5  |
| <b>Total Course Hours:</b>          | 135  |
| <b>Course Units:</b>                | 4  |
| <b>Grading Method:</b>              | Letter Grade only  |
| <b>Credit Status:</b>               | Credit, degree applicable  |
| <b>Transfer CSU:</b>                | Yes  |
| <b>Effective Date:</b>              | 04/16/2001   |
| <b>Transfer UC:</b>                 | No   |
| <b>Effective Date:</b>              |  |
| <b>General Education: ECC</b>       |  |
| <b>Term:</b>                        |  |
| <b>Other:</b>                       |  |
| <b>CSU GE:</b>                      |  |
| <b>Term:</b>                        |  |
| <b>Other:</b>                       |  |

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| <b>IGETC:</b>                     |  |
| <b>Term:</b>                      |  |
| <b>Other:</b>                     |  |
| <b>Student Learning Outcomes:</b> | <p><b>SLO #1 Concrete and Formwork Materials and Methods</b><br/>Students will be able to demonstrate a basic application of materials and methods commonly used in residential construction.</p> <p><b>SLO #2 Volume of Concrete</b><br/>Students will be able to calculate the volume of concrete in "yards."</p> <p><b>SLO #3 Auto Level</b><br/>Students will be able to set up an auto level for use in the laboratory.</p>   |
| <b>Course Objectives:</b>         | <ol style="list-style-type: none"> <li>1. Diagram a dimensioned plot plan from given data and information.</li> <li>2. From a given datum point, use the builder's level to determine the height of instrument, various elevations and their relationship to one another.</li> <li>3. Express various elevations either in engineering terms or feet and inches, and convert from one means of expression to the other, using three decimal places of accuracy or rounding properly to the nearest 1/16 inch.</li> <li>4. Calculate amounts of cut and fill needed for various types of soil from plans and written descriptions.</li> <li>5. Identify property lines, required setbacks, contour lines and datum point.</li> <li>6. Describe the standard materials, methods, dimensions, and procedures associated with the installation of forms for concrete footings, foundation walls and slabs on grade.</li> <li>7. Identify the CBC minimum requirements for residential concrete foundations and slabs on grade.</li> <li>8. Calculate amounts of concrete, rebar, and various hardware needed for residential structures from plans and written descriptions.</li> <li>9. Construct residential forms as per CBC Requirements.</li> </ol> |
| <b>Major Topics:</b>              | <p><b>I. Overview of concrete and framework (5 hours, lecture)</b></p> <ol style="list-style-type: none"> <li>A. Safety instructions</li> <li>B. Project requirements</li> </ol> <p><b>II. Overview of concrete and framework (10 hours, lab)</b></p> <ol style="list-style-type: none"> <li>A. Safety test</li> <li>B. Tour of lab <ol style="list-style-type: none"> <li>1. Material storage</li> <li>2. Building sites</li> <li>3. Safety equipment</li> <li>4. Large tool storage</li> </ol> </li> <li>C. Tool room</li> </ol> <p><b>III. Locating the building (15 hours, lecture)</b></p> <ol style="list-style-type: none"> <li>A. Land descriptions, property lines and setbacks</li> <li>B. Establishing site and building elevations</li> <li>C. Reading working drawings</li> <li>D. Scaled architectural drawings and the use of the architectural scale</li> <li>E. Care and use of the builder's level, automatic level and transit</li> </ol>   |

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|   | <p><b>IV. Locating the building (30 hours, lab)</b></p> <ul style="list-style-type: none"> <li>A. Land descriptions, property lines and setbacks</li> <li>B. Establishing site and building elevations</li> <li>C. Reading working drawings</li> <li>D. Scaled architectural drawings and the use of the architectural scale</li> <li>E. Care and use of the builder's level, automatic level and transit</li> </ul> <p><b>V. Excavation, concrete foundation, and walls (15 hours, lecture)</b></p> <ul style="list-style-type: none"> <li>A. Grading: cut and fill, soil shrinkage and swell factors, estimating excavation work</li> <li>B. Establishing building corners and stakes</li> <li>C. Methods for forming foundations, slabs, and walks</li> <li>D. Hardware used in connection with concrete foundations</li> <li>E. Estimating materials used in concrete work</li> <li>F. CBC minimum requirements</li> <li>G. Placing concrete</li> </ul> <p><b>VI. Excavation, concrete foundation, and walls (30 hours, lab)</b></p> <ul style="list-style-type: none"> <li>A. Grading: cut and fill, soil shrinkage and swell factors, estimating excavation work</li> <li>B. Establishing building corners and stakes</li> <li>C. Methods for forming foundations, slabs, and walks</li> <li>D. Hardware used in connection with concrete foundations</li> <li>E. Estimating materials used in concrete work</li> <li>F. CBC minimum requirements</li> <li>G. Placing concrete</li> </ul> <p><b>VII. Masonry (10 hours, lecture)</b></p> <ul style="list-style-type: none"> <li>A. Use of basic masonry tools and equipment</li> <li>B. Types of mortar and their characteristics</li> <li>C. Proportioning and mixing of mortars</li> <li>D. Laying brick and concrete blocks to a line</li> </ul> <p><b>VIII. Masonry (20 hours, lab)</b></p> <ul style="list-style-type: none"> <li>A. Use of basic masonry tools and equipment</li> <li>B. Types of mortar and their characteristics</li> <li>C. Proportioning and mixing of mortars</li> <li>D. Laying brick and concrete blocks to a line</li> </ul> |
| <b>Total Lecture Hours:</b>                                   | 45   |
| <b>Total Laboratory Hours:</b>                                | 90   |
| <b>Total Hours:</b>   | 135  |
| <b>Primary Method of Evaluation:</b>                          | 3) Skills demonstration  |
| <b>Typical Assignment Using Primary Method of Evaluation:</b> | From the working drawings provided, determine quantities of material and prepare a one-page estimate for excavation and concrete work for a 1,000 square foot structure. Submit the estimate to the instructor.  |
| <b>Critical Thinking Assignment 1:</b>                        | Given a site plan, calculate and create a one-page document stating the amount of cut and fill required to grade as per plans. Submit the document to the instructor.  |
| <b>Critical Thinking Assignment 2:</b>                        | Given a site plan, prepare a plot plan to the scale of 1/8" = 1' - 0" and then layout the plot plan to one-quarter actual size. Submit the plot plan to the instructor.  |

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| <b>Other Evaluation Methods:</b>   | Performance Exams<br>Class Performance<br>Multiple Choice<br>Completion<br>Matching Items<br>True/False   |
| <b>Instructional Methods:</b>  | Demonstration<br>Laboratory<br>Lecture<br>Multimedia presentations  |
| <b>If other:</b>   | Student research<br>Concrete and formwork presentations   |
| <b>Work Outside of Class:</b>  | Study<br><br>Required reading<br><br>Problem solving activities<br><br>Written work (such as essay/composition/report/analysis/research)                      |
| <b>If Other:</b>   |   |
| <b>Up-To-Date Representative Textbooks:</b>  | Leonard Koel. <u>Carpentry</u> , American Technical Publishers. 7th edition. 2021   |
| <b>Alternative Textbooks:</b>  |   |
| <b>Required Supplementary Readings:</b>  |   |
| <b>Other Required Materials:</b>   | Pocket calculator<br><br>Architectural scale<br><br>Safety glasses<br><br>Carpenter's nailing apron<br><br>Appropriate shoes and attire for construction work |
| <b>Requisite:</b>  |   |
| <b>Category:</b>   |   |
| <b>Requisite course(s): List both prerequisites and corequisites in this box.</b>  |   |
| <b>Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).</b> |   |
| <b>Requisite Skill:</b>  |   |

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| <b>Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable</b>   |             |
| <b>Requisite course:</b>   |             |
| <b>Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).</b>                      |             |
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| <b>Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable</b> |             |
| <b>Enrollment Limitations and Category:</b>  |             |
| <b>Enrollment Limitations Impact:</b>  |             |
| <b>Course Created by:</b>  | Tim Meza    |
| <b>Date:</b>   | 02/01/2001  |
| <b>Original Board Approval Date:</b>   | 04/16/2001  |
| <b>Last Reviewed and/or Revised by:</b>  | Ross Durand |
| <b>Date:</b>   | 03/28/2019  |
| <b>Last Board Approval Date:</b>   | 1/17/2023   |