Course Outline

COURSE: CARP 213
DIVISION: 50
ALSO LISTED AS:

TERM EFFECTIVE: Fall 2016
Inactive Course

SHORT TITLE: ENGINEERED STRUCTURAL SYSTEMS

LONG TITLE: Engineered Structural Systems

<table>
<thead>
<tr>
<th>Units</th>
<th>Number of Weeks</th>
<th>Type</th>
<th>Contact Hours/Week</th>
<th>Total Contact Hours</th>
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<td>1</td>
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<td>Lecture: 6</td>
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<td></td>
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<td>Lab: 30</td>
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<td>Other: 0</td>
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<td>Total: 36</td>
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COURSE DESCRIPTION:

This course covers the design of heavy timber construction, lamination, dams, bridges and trusses. Construct, in proper sequence, a panel roof system having hinge connectors, steel caps, beam seats, and sawn lumber roof members. Construct a truss roof system. Tie the basic knots used in rigging. Direct a crane using university recognized hand signals.

PREREQUISITES:

COREQUISITES:

CREDIT STATUS: C - Credit - Degree Non Applicable

GRADING MODES

L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

02 - Lecture and/or discussion
03 - Lecture/Laboratory
04 - Laboratory/Studio/Activity

STUDENT LEARNING OUTCOMES:

1. The student will demonstrate the ability to locate and install bearing hangers, bridging, blocking, and bracing.
2. The student will layout and install wood columns and beams with proper post bases, post caps, and hangers.

PROGRAM LEARNING OUTCOMES:
1. Demonstrate journey level skills, including those skills necessary to build all concrete infrastructures that comprise the California transportation system.
2. Locate on the blueprints and in the specifications, the information needed to construct various types of structures and assemble its various components.

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS
Inactive Course: 11/28/2016
Out-of class assignments: For each topic, the student will read chapters and do homework assignments at the end of those chapters.

2 lec, 10 lab
A. Framing systems
   a. Type of construction
   b. Uniform Building Code
   c. Framing systems
      a. Conventional framing
      b. Heavy timber
      c. Ordinary construction
      d. Plywood box
      d. Plan conventions
A. Framing materials
   1. Properties of wood
      A. Grading of wood products
      B. Soft wood lumber
      C. Structural glue-laminated timbers
      D. Wood-plywood glued structural members
      E. Plywood
      F. Material quantities
      G. Poles
   B. Framing layout, structural principles and design
      1. Structural plans and framing layout

12/5/2016
1. Grids
2. Tiedown symbols
3. Shear wall layout
4. Diaphragm construction and nailing schedule
5. Using the right triangle for layout
6. Laying out a brace
7. Structural principles and design
   1. Load
   2. Types of loads
   3. Strength
   4. Stiffness
   5. Horizontal members
   6. Camber
   7. Columns
8. Diaphragm construction
C. Tools and equipment
1. Hand tools
2. Power tools
   1. Safety rules for power tools
   2. Extension cords
   3. Procedures
SLO: The student will demonstrate the ability to safely use a portable electric circular saw, gasoline powered chain saw, electric drill motor, heavy duty reciprocating saw, electric rotary hammer, and electric impact wrench. The student will demonstrate the ability to follow engineered nailing and fastening schedules.
Assignments: Read the chapters covered in the lecture and do the homework exercises at the end of the chapters. Answer the study guide questions on the assigned subject.
Demonstrate the ability to safely use a portable electric circular saw, gasoline powered chain saw, electric drill motor, heavy duty reciprocating saw, electric rotary hammer, and electric impact wrench. Demonstrate the ability to follow engineered nailing and fastening schedules.

2 lec/10 lab
D. Connectors and structural hardware
1. Common fasteners
2. Timber fasteners
3. ICBO listed fasteners
E. Rigging
   a. Weight and shape
   b. Wire rope
      1. Wire rope lay
      2. Safety factors
      3. Wire rope end fittings
   c. Fiber rope
      a. Elements
      b. Strength
      c. Whipping ends
   d. Knots
d. Chains
e. Slings
f. Hooks
g. Hoisting materials
F. Erecting procedures
1. Lifting glulam beams
2. Erecting trusses
3. Temporary bracing
4. Ladders, stairs, and ramps

SLO: The student will identify the proper way to uncoil a spool of rope. The student will tie eight basic knots and select the proper knot for a specific rigging operation. The student will demonstrate the ability to locate and install bearing hangers, bridging, blocking, and bracing.

Assignments: Read the chapters covered in the lecture and do the homework exercises at the end of the chapters. Answer the study guide questions on the assigned subject.

Identify the proper way to uncoil a spool of rope. Tie eight basic knots and select the proper knot for a specific rigging operation. Demonstrate the ability to locate and install bearing hangers, bridging, blocking, and bracing.

G. Plank and beam construction
a. Plank and beam framing
b. Columns
c. Girders, beams, and joist
d. Compound beams
e. Decking material
   a. Length and lay-up arrangements
   b. Application and nailing schedules
   f. Safety in plank and beam construction
H. Glulam construction and panel roof systems
a. Glulam structural materials
   a. Fabrication
   b. Glulam timber specifications
   c. Advantages and limitations of glulams
d. Typical beam shapes
e. Cantilever and continuous span systems
b. The panel roof system
l. Trusses
A. Construction of trusses
   a. Height-to-span ratio
   b. Camber
c. Timber connectors
B. Light weight high strength trusses
C. Bracing trusses and beams during construction
D. Safety in erecting trusses, beams, and arches
   a. Working at heights
   b. Advanced planning for safety
c. Safeguarding against overloading

SLO: The student will demonstrate the proper use of hand signals to direct crane operations. The student will layout and install wood columns and beams with proper post bases, post caps, and hangers. The student will demonstrate the ability to install wood and wood-metal trusses and engineered manufactured structural components. The student will demonstrate the ability to locate and install lateral seismic ties in a roof structure.

Assignments: Read the chapters covered in the lecture and do the homework exercises at the end of the chapters. Answer the study guide questions on the assigned subject.

12/5/2016
Demonstrate the proper use of hand signals to direct crane operations. Layout and install wood columns and beams with proper post bases, post caps, and hangers.

Demonstrate the ability to install wood and wood-metal trusses and engineered manufactured structural components. Demonstrate the ability to locate and install lateral seismic ties in a roof structure.

2 hours

Final exam

METHODS OF INSTRUCTION:
A. Lecture and discussion
B. Visual aids
C. Demonstrations
D. Group hands-on exercise
E. Individual hands-on exercise
F. One-on-one hands-on instruction

METHODS OF EVALUATION:
The types of writing assignments required:
Written homework
Reading reports
Lab reports
Essay exams
The problem-solving assignments required:
Homework problems
Field work
Lab reports
Quizzes
Exams
The types of skill demonstrations required:
Class performance
Field work
Performance exams
The types of objective examinations used in the course:
Multiple choice
True/false
Matching items
Completion
Other category:
None
The basis for assigning students grades in the course:
Writing assignments:  10% - 30%
Problem-solving demonstrations:  10% - 40%
Skill demonstrations:  30% - 80%
Objective examinations:  10% - 30%
Other methods of evaluation:  0% - 0%

REPRESENTATIVE TEXTBOOKS:
Required:
Reading level of text, Grade: 10 Verified by: publisher/dvt

ARTICULATION and CERTIFICATE INFORMATION
Associate Degree:
CSU GE:
IGETC:
CSU TRANSFER:
Not Transferable
UC TRANSFER:
Not Transferable

SUPPLEMENTAL DATA:
Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN:
CAN Sequence:
CSU Crosswalk Course Department:
CSU Crosswalk Course Number:
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: A
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000500346
Sports/Physical Education Course: N
Taxonomy of Program: 095210

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