Course Information Form (CIF)

Course Code: IRW 116

Course Title: Reinforcing Blueprint Reading

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 15.1301
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 2-6-4
Credit Hour Distribution:

Lecture: 2	Lab: 6	Clinical: 0	**Total: 4**

General Course Information

Catalog Description

Concentrated areas include types and applications of reinforced concrete used in building road and bridge construction, fabricating, unloading, handling and storing reinforcing steel, and reading engineering and placing drawings.

General Course Objectives

Students will be able to safely and efficiently place reinforcement in concrete.

Minimum Placement Levels

English	Reading	Math
None	None	None

Prerequisites

Credit in IRW 115

Methods of Evaluation

The minimum methods of evaluation include 4 written and 3 practical exams.

Instructional Materials and Additional Supplies

Reinforcing, International Association of Ironworkers, latest edition
Reinforcing Blueprint, International Association of Ironworkers, latest edition
Reinforcing Post-Tension, International Association of Ironworkers, latest edition
Erection Safety of Precast and Stressed Concrete, International Association of Ironworkers, latest edition

Course Content

General Learning Outcomes (GLOs)

- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Reinforced Concrete: a) History of Reinforced Concrete; b) Types; c) Relationship of Concrete and Steel; d) Advantages of Reinforced Concrete; and e) Stress, Load, and Bond	1. Describe the historical development of reinforced concrete. 2. Identify and describe the type of concrete used in reinforcing. 3. List the advantages of using reinforced concrete in construction. 4. Define stress, load, and bond.	2	3	0
Manufacture of Reinforcing Steel: a) Fabricated Bars, b) Bar Sizes, and c) Identification Marks	1. Identify and describe the re-bar used in reinforcing work by type, grade, and size given the symbol on the bar or bundle tags.	1	3	0
Tools, Types of Ties, and Safety: a) Tools, b) Types of Ties, and c) Identification Marks	1. Identify and demonstrate the proper use of tools used for reinforcing rod work, and indicate where they are used. 2. Calculate equal spacing of bars, given job specifications. 3. Identify and demonstrate the five ties used on re-bar.	2	3	0
Types of Reinforced Concrete Building Construction: a) Walls, b) Footings, c) Grade Beam, d) Pile Foundation, e) Deep Pier or Open Caisson, f) Forms, g) Floor, h) Slabs, i) Special Reinforced Concrete Roof Construction, and j) Bins and Tanks	1. Given a construction diagram, label the parts of the construction pictured. 2. Describe the location and purpose of a beam, girder, pile foundation, deep pier, footing, column, and slab. 3. Name and describe the five types of slabs.	1	3	0
Bridge Construction: a) Parts, and b) Types	1. Name and describe the functions of the parts of a bridge. 2. Name and describe types of bridges and where they are used.	1	3	0
Reinforcing Steel - Purpose and Location in Concrete: a) Compression, b) Shear, c) Tension, d) Beam, e) Floors, f) Walls, g) Footings, h) Stair Landings, I) Compression Reinforcement, and j) Concrete Protection	1. Define compression, shear, and tension. 2. Name and describe the three types of shear, indicating where they occur. 3. Describe the location of reinforcement needed in walls, floors, footings, stair landings, and four types of beams. 4. Describe the compression reinforcement used in columns and beams.	1	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Fabrication of Reinforcing Steel: a) Manufactured vs. Fabricated Reinforcement, b) Identification, c) Sorting, d) Fabrication Methods, e) Bend Corrections, f) Bending Tables, g) Bar Bends, h) Spirals, i) Spacers, j) Tolerance, k) Radii, l) Length of Bar, m) Marking and Bending, n) Bundling, and o) Marking	1. Contrast fabrication and manufacture of reinforcing steel. 2. Identify a bar or stirrup by type number. 3. Sort reinforced bar to proper placing order. 4. Identify incorrectly bent bar. 5. Correctly use a bending table. 6. Describe spirals, assembled spirals, and unassembled spirals, and where they are used. 7. Describe tolerances for length and bends of rods. 8. Calculate acceptable bending radii for hooks and bends for any size rod. 9. Calculate length of bar needed to fabricate column ties, stirrups, and hook bars, given the concrete dimensions or reinforcing part dimensions. 10. Describe and demonstrate procedures in marking and bending column ties, stirrups, and hook bars. 11. Correctly bundle and tag bars, unassembled spirals, and assembled spirals. 12. Describe the usual marking systems used on drawings to identify building structure and highway structure locations. 13. Fabricate the part in the shop, given a description of a bend, tie, hook, or stirrup.	1	3	0
Unloading, Handling, and Storing: a) Arrangements, b) Unloading, c) Cranes, d) Load Weight, e) Spreader Bar, f) Hand Signals, g) Tag Lines, h) Bundling, i) Coatings, j) Carrying, and k) Marking and Tagging	1. Describe the arrangement necessary between the ironworker foreman and the project superintendent prior to delivery of reinforced steel to the job site. 2. Describe and demonstrate safe unloading of reinforced steel both manually and using power equipment. 3. Identify four types of cranes and their parts, and describe the advantages of the use of one type of crane over another. 4. Match the appropriate hook, shackle, sling, and/or choker to the load weight to be moved. 5. Describe the purpose of a spreader bar. 6. Recognize and perform all hand signals for cranes, clam buckets, telescoping booms, crawlers, lines, overhead and gentry cranes, and helicopters. 7. Identify situations requiring tag lines. 8. Demonstrate bar bundling techniques in appropriate weight groupings. 9. Describe the acceptable coating, rusting, and scaling of re-bar and unacceptable coatings. 10. List and describe proper marking and tagging of bars at the job site, including necessary information and color coding.	2	6	0
Engineering and Placing Drawings: a) Content, b) Purpose, and c) Drawings	1. Describe the content and purpose of a placing drawing. 2. Identify the five types of drawings used in construction, and describe their purposes. 3. Identify and describe the following specifications: general notes, wall location diagrams, slab panel location diagrams, plan, section detail, elevation, schedule, and detail sheet. 4. Recognize and define the symbols, lines, and abbreviations used on drawings and detail sheets. 5. Read and follow specifications, diagrams, plans, and schedules. 6. Read and follow placing drawings for various types of construction projects requiring reinforcing work.	2	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Bar Supports: a) Classification of Bar Supports, b) Wire Sizes, c) Types and Sizes of Bar Supports, d) Definitions of Bar Supports, e) One-way Joist Constructions, f) Beams and Girders, g) Slab Spacers, h) Placement of Supports and Bars, i) Calculation of Bar Quantities, j) Reed Clips, and k) Bar Supports for Highway Bridge Slab Reinforcement	1. Select the correct minimum wire size to use with specific bar supports. 2. Place bar support and bars in proper sequence for specific types of construction. 3. Calculate the quantity of bar supports required for specific types of construction.	2	6	0
Placing Reinforcing Steel in Footings: a) Superstructure, b) Substructure, c) Function, d) Footing Schedule, e) Types of Footings, f) Mat Ties, and g) Column Dowels	1. Define superstructure and substructure. 2. Describe the function of reinforcing in footings. 3. Interpret the footing schedule. 4. Demonstrate the ability to tie mats to be used for square or rectangular footings, continuous wall footings, pile caps, cantilever footings, stepped footings, or mat slabs. 5. Place column dowels correctly.	2	6	0
Placing Reinforcing Steel in Walls: a) Types of Walls, b) Erection Procedures, c) Double Curtain Wall, d) Types of Wall Mat Spacers, e) Wall Bars, f) Typical Double Curtain Reinforcing Details, g) Cantilevered Retaining Walls, h) Wall Reinforcing Ties, and i) Column Walls	1. Describe the three basic types of reinforced concrete walls. 2. Describe the sequence of events when erecting a wall accounting for reinforcing, forms, and the pour. 3. Place the correct reinforcing for inner faces, outer faces, and corners of walls. 4. Describe the different procedures required for cantilever retaining walls. 5. Use the appropriate tie for wall reinforcing.	2	12	0
Placing Reinforcing Bars in Columns: a) Columns, b) Column Ties, c) Lapped Splices, d) Typical Tied Columns - Preassembly Procedure, e) Rectangular Column, f) Assembled-In-Place-Column Unit, g) Supports for Column Units, h) Pier Columns, i) Spiral Columns, j) Round Columns - Assembly	1. Describe the purpose, parts, and construction of a column and the different types of columns. 2. Make the appropriate ties for column reinforcing. 3. Demonstrate the ability to lap splice column sections. 4. Provide the appropriate support for column units.	2	9	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Placing Reinforcing Steel in Beams and Girders: a) Placing Sequence; b) Closed Ties; c) Top Bars in Beam; and d) Form Ties, Anchors, and Inserts	1. Place reinforcing parts in the order required to avoid threading and confusion in beam and girder construction. 2. Describe the purpose of closed ties. 3. Describe procedures to place form ties, anchors, and inserts in the order identified for a job.	2	12	0
Placing Reinforcing Steel in Joists and Slabs: a) Joist Reinforcing; b) Slab Reinforcing; c) One-way Slabs; d) Temperature Bars; e) Holes and Openings; f) Ties Used for Slabs; g) Placing and Tying a One-Way Slab; h) Two-way Slabs; i) Stairs; j) Wire Reinforcement; k) Welding Wire Fabric; l) Lap Splices for Plain Welded Wire Fabric; m) Styles of Fabric; n) New Number Wire Sizes; o) Slabs; p) Folded Plates; q) Arches, Barrel Shell Roofs, Dome Roofs, and Groined Vaults; and r) Bins, Tanks, and Grain Elevators	1. Demonstrate ability to place reinforcing for a joist and slab system in proper sequence. 2. Demonstrate ability to place reinforcing for a one-way slab, two-way slab, two-way waffle slab, and stairs, on the ground or a grade, in the proper sequence. 3. Demonstrate ability to lap splice and place welded wire fabric. 4. Identify wire by style and W-number. 5. Demonstrate ability to place reinforcing for bins, tanks, and grain elevators in the proper sequence.	2	5	0
Highway Structures: a) Common Structure, b) Drawings, c) Bar Support and Bar Lists, d) Bridge Deck, e) Cover, and f) Bundling	1. Identify common highway structures. 2. Describe the differences between highway reinforcing and building reinforcing. 3. Describe the bar supports, bar lists, and bundling techniques used in highway construction. 4. Describe the use of cover on highway structures.	1	3	0
Highway and Airport Pavement: a) Continuously Reinforced Concrete Pavement, b) Construction and Transverse Joints, c) Dowel Assemblies, and d) State Differences	1. Describe the state-to-state differences for pavement construction. 2. Describe the effects of incorrectly placed bar in pavement and place reinforcing for pavement construction. 3. Describe the different types of joints used in pavement construction.	1	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
General Principles for Bar Splicing and Welding: a) Length Limitations; b) Lapped, Bundled, and Welded Splices; and c) Mechanical Splicing	1. Describe bar length limitations and the purpose of splicing. 2. Demonstrate the three types of splices.	1	2	0
Exams	1. Complete all required examinations.	2	2	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	90	0