

Concrete Theory Outcomes

(Classroom discussion and student demonstration will use the textbook Carpentry 4th Edition and related workbook assignments. Also used will be the Iowa Ready Mix Concrete Association(IRMCA) curriculum provided to Iowa high schools.)

Iowa Central Community College Outcomes

1. *Critical Thinking:* The ability to dissect a multitude of incoming information, sorting the pertinent from the irrelevant, in order to analyze, evaluate, synthesize, or apply the information to a defensible conclusion.
2. *Effective Communication:* Information, thoughts, feelings, attitudes, or beliefs transferred either verbally or nonverbally through a medium in which the intended meaning is clearly and correctly understood by the recipient with the expectation of feedback.
3. *Personal Responsibility:* Initiative to consistently meet or exceed stated expectations over time.

Iowa Central Community College Industrial Technology Department Outcomes

1. Enhance our partnerships with local industry to fulfill their employment and training needs.
2. Students will possess the skills needed to be gainfully employed in their chosen career path.
3. Students will demonstrate competency in the skills needed to satisfy their educational goals.

Course Outcomes

1. List the materials in which concrete is made.
Classroom discussion(Unit 37 Concrete and IRMCA Module 3)

2. State the definitions for the various terms used in concrete construction.
Classroom discussion(Section 8 Foundation and Outdoor Slab Construction and IRMCA Module 1,2,3)
3. List the common types of cement and state where each is used.
Classroom discussion(Unit 37 Concrete and IRMCA Module 3)
4. List the various types of concrete admixtures and state the effect each has on concrete .
Classroom discussion(Unit 37 Concrete and IRMCA Module 3)
5. List the types of reinforcement used in concrete and state where each is used and the reason for using any type of reinforcement.
Classroom discussion(Unit 37 Concrete and IRMCA Module 4)
6. State proper methods of common concrete handling procedures.
Classroom discussion(Unit 37 Concrete and IRMCA Module 4)
7. List concrete conveying methods used on the job site.
Classroom discussion(Unit 37 Concrete and IRMCA Module 4)
8. State the procedures used for finishing concrete.
Classroom discussion(IRMCA Module 6)
9. Identify common concrete finishing tools and equipment.
Classroom discussion(IRMCA Module 6)
10. Review of case studies and common defects.
Classroom discussion(IRMCA Reference material)

11. List proper procedures when handling concrete to prevent segregation of aggregates and excessive water bleeding to the surface.
Classroom discussion(IRMCA Module 6 and reference materials)
12. Define the various formwork terms.
Classroom/Lab activity(Unit 38 Forming Methods and Materials)
13. Layout and construct flatwork and footing formwork.
Concession stand project/Sidewalk repair project
14. Strip footing forms.
Concession stand project/Sidewalk repair project
15. Layout and set anchor bolts.
Concession stand project
16. Understand the need for safety on the job.
Classroom discussion(IRMCA Module 4)
17. Learn the safe use of tools.
Classroom discussion(IRMCA Module 4)
18. Learn the different ways of mixing concrete.
Classroom discussion(Unit 37 Concrete and IRMCA Module 2)
19. Know the different materials used in making concrete.
Classroom discussion(Unit 37 Concrete and IRMCA Module 3)
20. Learn to identify basic footing and foundation forms.
Classroom discussion(Unit 36 Types of Foundation and Unit 38 Forming Methods and Materials)

21. Become familiar with the terminology associated with form construction.
Classroom discussion(Unit 38 Forming Methods and Materials and IRMCA)
22. Become familiar with how to strip forms.
Concession stand project/Sidewalk repair project
23. Install rigid insulation under concrete of concrete slab floors.
Concession stand project/Sidewalk repair project
24. Set drive, walk, and patio side forms to the proper grade by use of a string line.
Concession stand project/Sidewalk repair project
25. Stake and brace side forms to horizontal curves in concrete construction.
Sidewalk repair project
26. List four materials used to form horizontal curves in concrete construction.
Classroom discussion(Unit 37 Forming Methods and Materials)
27. Construct horizontal curved concrete forms as specified by the Portland Cement Association.
Sidewalk repair project
28. Calculate the number of cubic yards of concrete needed for a specific driveway or walk.
Classroom discussion and student demonstration

29. List eleven essential items that must be ready and waiting at the job site where the concrete is delivered and ready for placement.
Classroom discussion(IRMCA Module 4)
30. Develop a detailed sketch of plans for transporting concrete to a specific placement site from the redi-mix truck.
Classroom discussion and student demonstration. Concession stand project/Sidewalk repair project
31. Plan routing in reference to direct placement from chute,, wheelbarrow, or bucket.
Classroom discussion and student demonstration. Concession stand project/Sidewalk repair project
32. Spade concrete along forms for compaction and to eliminate the formation of voids and honeycomb.
Concession stand project/Sidewalk repair project
33. Remove excessive concrete from within the form by bringing the surface to grade by strike off.
Concession stand project/Sidewalk repair project
34. Level ridges and fill voids in concrete with a bull-float or darby immediately after completing the strike off.
Concession stand project/Sidewalk repair project
35. List five factors that control the length of the waiting period immediately preceding the first finishing operation.
Classroom discussion(IRMCA Module 4)
36. Cut concrete away from the forms before edging to a depth of one inch immediately after floating.
Concession stand project/Sidewalk repair project

37. Compact and harden the concrete surface next to the form into a rounded edge using an edging tool with a ½ inch radius when concrete has firmed enough to hold the shape of the edge tool.
Concession stand project/Sidewalk repair project
38. Compare three kinds of control joints used in concrete walks, drives, and patios. Include full scale sketches of each kind with complete detailed dimensions.
Classroom discussion(IRMCA Module 4)
39. Layout and hand tool control joints in drive, walk, or patios.
Concession stand project/Sidewalk repair project
40. Explain in writing three purposes for floating concrete.
Classroom discussion(Unit 37 Concrete and IRMCA Module 6)
41. Level the surface of concrete by floating using a hand operated float of a size adequate for the job.
Concession stand project/Sidewalk repair project
42. Trowel the surface of concrete to a smooth, hard, dense surface.
Concession stand project/Sidewalk repair project
43. Broom the surface of concrete to create an attractive textured nonslip surface.
Concession stand project/Sidewalk repair project
44. Write three acceptable methods of curing concrete.
Classroom discussion(Unit 37 Concrete and IRMCA Module 6)

45. ACI flatwork certification, which is a 2 day course with a certification exam.(We do not do this within our program.)

IRMCA curriculum also includes a ready-mix plant tour, career opportunities discussion, decorative concrete, and employability skills review.

Intro To Residential Construction Outcomes

(Classroom/Lab activities will use the textbook Carpentry 4th Edition and related workbook assignments)

Habitat project work will be assigned by Gary VonAhsen and depends on what the Saturday volunteer groups get done each week.

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1. List the tasks which a carpenter should be able to do.
Classroom discussion (Chapter 2 The Building Trades)

2. Become familiar with safety equipment and how to use it.
Classroom discussion and demonstration (Chapter 22 Job Site Safety and Working Conditions)
3. Become familiar with basic tools covered and their terminology.
Classroom discussion and demonstration (Section 3 Hand Tools and Section 4 Power Tools)
4. Become familiar with how tools are used in the job.
Classroom discussion and demonstration (Section 3 Hand Tools and Section 4 Power Tools)
5. Learn the safety procedures associated with each tool.
Classroom discussion and demonstration (Section 3 Hand Tools and Section 4 Power Tools)
6. Operate tools with a high level of accuracy, skill, and safety.
Classroom discussion and demonstration (Section 3 Hand Tools and Section 4 Power Tools)
7. Learn safe use of layout and measuring devices.
Classroom discussion and demonstration (Chapter 3 Measuring and Layout Tools)
8. Learn the basic wood terminology.
Classroom discussion (Chapter 3 The Nature of Wood)
9. State how and why lumber is graded.
Classroom discussion (Unit 5 Softwood and Hardwood)

Site Layout and Blueprint Outcomes

(Classroom/Lab activities will use the textbook Carpentry 4th Edition and related workbook assignments.)

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Course Outcomes

1. Develop a plot plan on paper.
Classroom discussion and demonstration(Unit 25 Plot Plans also hands on practice.)
2. Setup laser and builder's level.
Classroom discussion and demonstration(Unit 33 Builder's Levels, Automatic Levels, and Transit-Levels also hands on work with different levels.)
3. Layout a structure in the field.
Classroom discussion and demonstration/Concession stand project(Unit 35 Building Site and Foundation Layout also hands on work doing layout.)
4. Establish and construct batter boards in the field.
Classroom discussion and demonstration/Concession stand project(Unit 35 Building Site and Foundation Layout also hands on work setting batter boards.)
5. Establish footing and other foundation lines.
Classroom discussion and demonstration/Concession stand project(Unit 35 Building Site and Foundation Layout also hands on work.)
6. Determine ground elevations and place on a plot plan.
Classroom discussion and demonstration/Concession stand project(Unit 25 Plot Plans also hands on work.)

7. Locate physical features in the field and place on a plot plan.
Classroom discussion and demonstration/Concession stand project(Unit 25 Plot Plans also hands on work.)
8. List three methods of removing water that may collect at the site during construction.
Classroom discussion
9. Verify the property boundaries according to measurements on the site plot plan.(A metal surveyor's pin should exist at each corner of the property.)Classroom discussion and demonstration(Unit 35 Building Site and Foundation Layout also hands on practice.)
10. Read and understand covenants, setbacks, variances, and easements.
Classroom discussion(Unit 32 Building Codes, Zoning, Permits, and Inspections.)
11. Stake the ends of the building setback line and side yard distance requirements to within + or - $\frac{1}{4}$ inch.
Classroom discussion and demonstration(Unit 35 Building Site and Foundation Layout also hands on practice.)
12. Stake out location of the outer walls of the structure by measuring from an established reference line (building setback line) and drive stakes at all corners of the structure.
Classroom discussion and demonstration/Concession stand project(Unit 35 Building Site and Foundation Layout also hands on practice.)
13. Setup and level a builder's level to bubble level accuracy.
Classroom discussion and demonstration(Unit 33 Builder's Levels, Automatic Levels, and Transit-Levels and hands on work with levels.)

14. List three purposes that batter boards serve as a construction device.
Classroom discussion(Unit 35 Building Site and Foundation Layout.)
15. Erect and level batter boards at all corners of the proposed foundation wall to a tolerance of + or - $\frac{1}{8}$ inch.
Classroom discussion and demonstration(Unit 35 Building Site and Foundation Layout.)
16. Establish the outline of the foundation wall by measuring and making on the top surface of the horizontal members of the batter boards.
Classroom discussion and demonstration(Unit 35 Building Site and Foundation Layout also hands on practice.)
17. Square the foundation layout to within + or - $\frac{1}{4}$ inch by stretching string to represent the outside edge of the foundation walls and compare the diagonal measurements.
Classroom discussion and demonstration(Unit 35 Building Site and Foundation Layout also hands on practice.)
18. Establish footing line locations on batter boards to tolerance of + or - $\frac{1}{8}$ inch.
Classroom discussion and demonstration(Unit 35 Building Site and Foundation Layout also hands on practice.)
19. Use $\frac{1}{4}$ " and $\frac{1}{2}$ " scales to determine various blueprint dimensions.
Classroom discussion and demonstration(Section 6 Building Design and Printreading)

20. Use construction master calculator to calculate exact layout lines and diagonals.

Classroom discussion and demonstration(Construction Master workbook activities.)

10. State how lumber should be cared for on the job site.
Classroom discussion (Unit 22 Job Site Safety and Working Conditions)
11. State the various types of framing systems.
Classroom discussion (Chapter 30 Details and Framing Plans and Section 9 Floor, Wall, and Ceiling Frame Construction)
12. State the causes and effects of wood shrinkage.
Classroom discussion (Chapter 4 Lumber Manufacture)
13. Layout and construct a floor including sills, joists, center beam & posts, and openings.
Habitat project/Concession stand project(Student demonstration)
14. State the effects of notching and drilling joists.
Classroom discussion(Student demonstration)
15. Install a compressible sill plate sealer on top of the foundation wall before the sill plate is fastened to the wall for the purpose of reducing air infiltration. Habitat project/Concession stand project
(Student demonstration)
16. Install sub-flooring. Habitat project/Pressbox project
(Student demonstration)
17. Identify the various floor framing connectors and install them.
Habitat project/Pressbox project(Student demonstration)
18. Identify the various types of prefabricated floor joists.
Classroom discussion (Chapter 42 Floor Framing)

19. State how prefabricated floor joists are manufactured and installed.
Classroom discussion (Chapter 42 Floor Framing)
20. Identify the various types of house framing.
Classroom discussion (Chapter 43 Wall Framing and Chapter 45 Metal Framing)
21. Layout, construct, and erect a complete wall system, including corners, intersections, & window and door openings utilizing a door and window schedule for the rough opening sizes.
Habitat project/Pressbox project/Concession stand project(Student demonstration)
22. Install windows and doors.(Student demonstration)
Habitat project/Pressbox project/Concession stand project
23. Define panelized and modular framing systems.
Classroom discussion (Chapter 1 Types of Construction)
24. Identify the various types of drywall fasteners and where each are used.
Classroom discussion (Chapter 58 Interior Wall and Ceiling Finish)
25. Install drywall.(Student demonstration)
Habitat project/Pressbox project/Concession stand project
26. Understand basic drywall construction principles.
Classroom discussion (Chapter 58 Interior Wall and Ceiling Finish)
27. Learn the basic lumber abbreviations.
Classroom/Lab activity (Chapter 6 Size, Shapes and Dimensions of Lumber)

28. Become familiar with common wood joints.
Classroom discussion (Review wood joints from the woodworking text and classroom examples)
29. Understand the basic principles of modular construction.
Classroom discussion (Chapter 1 Types of Construction)
30. Become thoroughly familiar with plywood construction and application.
Classroom discussion (Chapter 7 Engineered Wood Products)
31. Learn to order plywood for various building situations.
Classroom discussion (Chapter 7 Engineered Wood Products)
32. Understand the advantage of glued and laminated lumber.
Classroom discussion (Chapter 7 Engineered Wood Products)
33. Understand the manufacture and use of hardboard, particleboard, and fiberboard.
Classroom discussion (Chapter 7 Engineered Wood Products)
34. Understand the advantages and application of treated woods.
Classroom discussion (Chapter 4 Lumber Manufacture)
35. Understand how metal framing materials are used in the construction industry today.
Classroom discussion (Chapter 45 Metal Framing)
36. Follow manufacturer guidelines, guest speakers, and different plant tours. (Tour of Pella window plant, ready mix concrete plant, jobsites, and have guest speakers including Iowa Central faculty.)