

Department:

Construction Trades Division; Construction Technology Program

Course Description:

Though the finishing of footings, foundations, and floor slabs is typically done by subcontractors, there are occasions when the residential carpenter is called on to build basic forms and place reinforcing materials in the structure. This course is a study of the reinforcing materials, concrete and basic formwork used in construction. Student will learn how to perform several concrete finishing tasks, such as mixing concrete, building forms, finishing, and consolidating concrete, and using concrete reinforcing materials.

Course Competencies:

The learning outcomes and competencies detailed in this syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups for this course as approved by the Kansas Board of Regents.

Upon completion of the course, the student should be able to:

PROPERTY OF CONCRETELearning Objectives

1. Identify various concrete ingredients and describe their purpose in a concrete mixture
 - Explain how Portland cement affects the mixture of distinct types of cement.
 - Describe the characteristics of aggregate used in a concrete mixture.
 - List the characteristics of water used in a concrete mixture.
 - List types of concrete admixtures and what effects they will have on concrete.
2. Identify proper concrete mixture measurements and curing methods
 - Describe normal concrete-mix proportions
 - List special types of concrete
 - Describe the properties of air-entrained concrete
 - Describe how concrete is cured.
3. Describe the methods for testing concrete
 - Describe the proper procedure for sampling concrete.
 - Explain the purpose of a slump test.
 - Describe how a concrete compression test is performed
4. Calculate concrete volume for rectangular or circular structures.
 - Calculate rectangular volume.
 - Calculate circular volume.

Performance Tasks

1. Perform a concrete slump test or create a concrete test cylinder.
2. Calculate concrete volume requirements using formulas, concrete tables and/or concrete calculators as applicable.

REINFORCING CONCRETE

Learning Objectives

1. List applications of reinforced concrete
 - Describe how forces are resisted in concrete through reinforcing bars.
 - List applications for reinforced structural concrete.
 - Discuss how posttensioned concrete is created.
2. Describe the general requirements for working with reinforcing steel, including tools, equipment, and fabricating methods.
 - List general safety precautions when working with reinforcing steel.
 - Describe the universal characteristics of reinforcing steel.
 - Discuss how reinforcing steel is fabricated.
 - Explain the purpose of bar supports.
 - Explain how welding wire fabric reinforcement is used to reinforce concrete.
3. Describe methods by which reinforcement bars may be bent and cut in the field.
 - Describe how to cut rebar.
 - Describe how to bend rebar.
4. Explain the methods for placing reinforcing steel.
 - Discuss the proper methods for tying and splicing reinforced steel.
 - Explain the proper procedure for placing reinforcing steel.

Performance Tasks

1. Use appropriate tools to cut and bend reinforcing bars.
2. Demonstrate five types of ties for reinforcing bars.
3. Demonstrate proper lap splicing of reinforcing bars using wire ties.
4. Demonstrate the proper placement, spacing, tying, and support for reinforcing bars.

HANDLEING AND PLACING CONCRETE

Learning objectives

1. List the safety precautions for handling, placing and finishing concrete.
 - List the rules for the care and safe use of hand tools when handling and placing concrete.
 - List the rules for the care and safe use of power tools when handling and placing concrete.
 - Explain how to prevent cement dermatitis.
2. Identify the methods of moving and handling concrete.
 - Identify off-site equipment for mixing and conveying concrete.
 - Identify on-site equipment for mixing and conveying concrete.
 - Explain how to use hand and power tools for mixing and conveying concrete.
3. Explain the proper methods for placing and consolidating concrete into forms.
4. Describe the proper methods for finishing and curing concrete.
 - Explain the proper method for screeding concrete
 - Explain the proper method for leveling concrete
 - Explain the proper method for finishing concrete.
 - Describe how to properly cure concrete.
 - Describe the use of joint sealants.
 - Identify the tools used to rub and patch concrete.
5. Identify the various kinds of joints in concrete structures.
 - Identify construction joints, isolation joints, control joints, and decorative joints.

Performance tasks

1. Properly place and consolidate concrete in selected concrete forms.
2. Use a screed to strike off and level a concrete surface.

3. Use a bull float and/ or darby to level and smooth a concrete surface.
4. Use an eager to form a radius at the edges of concrete pad, slab, etc.
5. Use a hand float and finishing trowel to level high spots, remove imperfections, and smooth a concrete surface.
6. Use a jointer to make control joints on a concrete surface.

Course Content:

- A. Properties of Concrete
- B. Reinforcing Concrete
- C. Handling and Placing Concrete

Learning Assessments:

Competencies will be assessed by assignments, case problems, quizzes, chapter tests, hands-on projects, lab assignments, practical final assessment, and a final test. The test can be in the objective format or in a problem-solving format.

Instructional Materials:

Textbook: NCCER. (2024). Carpentry Forms Level 3 Trainee Guide (5th ed.). Boston, MA: Pearson. ISBN-13: 978-0133823059

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the “Disabilities Self-Identification Form” on our [Disability Services website](#).

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination, and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination, or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an [online report](#) about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our [Equity Grievance Policy](#).