Luna Community College

Building Technologies
Vocational Program

Curriculum Profile
2012-2015

Academic Proposal

LCC Building Trades Vocational Program
Including NCCER Certification with Program Completion

1.0 Program Description

1.1 Introduction

This program is an in-depth, pre-requisite based curriculum, organized to provide the skills and educational background necessary to enter a construction-related career. The curriculum covers all aspects of construction, including excavating, foundations, footings and slabs, blueprint reading, site layout, stair layout, roofing systems, wall and ceiling framing, window and door installation, form work, and many additional aspects of the construction trades. Safety is covered in accordance with current legal procedures and practices. Students will benefit from hands-on experience. Students will learn skills by action: active skills versus theoretical skills. Although some theory is included in classroom instruction, it is always presented in a way that assists the trainee in understanding the theoretical purpose behind each skill. This program's curriculum follows The Associated General Contractors (AGC) standards and curriculum. Students who successfully complete the program will also have earned National Center for Construction Education and Research (NCCER) certification.

1.2 Academic Purpose and Objectives

The academic goal of this certification program is to prepare students with necessary entry-level job skills in the building trades/technologies professions.

The objectives that guide the faculty and administration in the education and training of students in the building technology certification program are:

1. To provide a solid knowledge of all aspects and procedures used in the building trades profession;

2. To apply practical skills in the construction of building projects of variable sizes and specifications;
3. To integrate knowledge and skill in the process of completing various construction projects within a safety-focused environment;
4. To interpret information and instructions presented in both written and verbal form;
5. To demonstrate critical thinking skills and the ability to solve problems using those skills;
6. To demonstrate knowledge of computer systems and explain common usage of computers in the industry, including specialized computer software programs, and;
7. To communicate effectively on construction jobsites using various electronic communication devices.

1.3 Curriculum

The following curriculum is established, in its entirety, according to the Code of Federal Regulations (CFR) 29:29, which dictates specific guidelines for any Bureau of Apprenticeship and Training (BAT) approved apprenticeship program.

Core Curriculum

(4 Credit Hours)

Basic Safety
Introduction to Construction Math
Introduction to Hand Tools
Introduction to Power Tools
Introduction to Construction Drawings
Basic Rigging
Basic Communication Skills
Basic Employability Skills
Introduction to Material Handling

Carpentry Fundamentals, Level I

(7 Credit Hours)

Orientation to the Trade

Building Materials, Fasteners, and Adhesives

Hand and Power Tools

Reading Plans and Elevations

Floor Systems

Wall and Ceiling Framing

Roof Framing

Introduction to Concrete and Reinforcing Materials

Windows and Exterior Doors

Basic Stair Layout

Carpentry Framing and Finishing, Level II: Commercial Path

(8 Credit Hours)

Commercial Drawings

Thermal and Moisture Protection

Cold-Formed Steel Framing

Drywall Installation

Drywall Finishing

Doors and Door Hardware

Suspended Ceilings

Window, Floor, Door, and Ceiling Trim

Cabinet Installation

Carpentry Framing and Finishing, Level II:

Residential Path

(8 Credit Hours)

Roofing Applications

Thermal and Moisture Protection

Exterior Finishing

Cold-Formed Steel Framing

Drywall Installation

Drywall Finishing

Doors and Door Hardware

Window, Door, Floor, and Ceiling Trim

Cabinet Installation

Carpentry Forms, Level III

(8 Credit Hours)

Rigging Equipment

Rigging Practices

Properties of Concrete

Reinforcing Concrete

Handling and Placing Concrete

Trenching and Excavating

Foundations and Slabs on Grade

Vertical Form Work

Horizontal Form Work

Tilt-Up Wall Panels

Advanced Carpentry, Level IV

(4 Credit Hours)

Site Layout 1: Distance Measurements and Leveling

Site Layout 2: Angular Measurements

Advanced Roof Systems

Advanced Wall Systems

Advanced Stair Systems

Introduction to Light Equipment

Welding (Elective)

Commercial Finish Work

Site Preparation

Introductory Skills for Crew Leaders

Program Requirements

(22 hours)

Course Number	Course Description:
BT112	Building Construction I
BT113	Building Construction Applications I
BT114	Building Construction II
BT115	Building Construction Applications II
VOC109	Fundamentals of Vocational Education
VOC117	Blueprint Reading and Construction Math

Approved Elective Courses:

(9 Credit Hours)

Course Number:	Course Description:
BT 130	Basic Plumbing Principles

BT 142	Building Construction III
BT 143	Building Construction Applications III
BT 154	Building Construction IV
BT 155	Building Construction Applications IV
BT 207	International Building Code
BT 215	Concrete Finishing I
BT 231	Concrete Finishing II
BT 232	Concrete Finishing Applications II
FCMK 100	Introduction to Furniture and Cabinet-Making
FCMK 104	Planning, Layout and Design
FCMK 118	Advanced Furniture and Cabinet Design
FCMK130	Advanced Woodworking Projects

2.0 Need For Program

The dramatic shortage in skills within current construction workforces, combined with the shortage of new workers entering the industry, is forcing the construction industry to design and implement new training initiatives to address these shortages. Our society will always have a need for new homes, roads, transportation centers (i.e. airports, etc.), hospitals, schools, office buildings, etc. This means there will certainly always be sources of well-paid positions and career opportunities for carpenters and other construction trade professionals (Authoring Team, Prentice Hall Publishing, and the NCCER).

The basic intent of this program, under NCCER certification guidelines, is to supplant governmental control and credentialing of the national construction workforce with **industry-driven training and educational programs. NCCER departs from traditional** classroom instruction and learning by adopting a pure competency-based training regimen. Nationally, there are currently only selected vocational high-schools, and very few college-based institutions, offering a NCCER certification program. And, these college-based programs are sparsely scattered throughout the nation, (e.g. Florida, Georgia, Virginia, Oklahoma, and Texas). Implementing this program at Luna Community College would make it the first of its kind in the state of New Mexico, and only the second in the greater Southwestern United States.

2.1 Luna Community College Mission

Luna Community College is an institution of higher learning committed to serving the changing needs of its student population and the surrounding communities. Its mission is to provide comprehensive education, preparations for relevant employment, and opportunities for life-long learning. The guiding principles of LCC are to:

- Prepare students for employment through a broad range of vocational, technical, and professional education programs.
- Enhance job effectiveness and continue training in keeping up with changes in the job market and technology.
- Assist students in gaining equitable accessibility to education opportunities.
- Provide continuing education and community service to northeastern New Mexico.
- Offer certificates and associate degrees.
- Promote transfer of credits between institutions of higher education.
- Educate students regarding intellectual, psychological, philosophical, and social issues that address human experience, namely: critical thinking/problem solving, cultural diversity, intra/interpersonal skills, and ethical responsibilities

2.2 Building Technologies Program Mission

The mission of the building technologies program is to attract, train, and motivate the next generation of construction professionals, including designers, builders, and managers. This program will bring the construction industry to students, and new students to the construction industry.

2.3 Relationship to Luna Community College Mission

2.3.1 The Building Technologies/NCCER Certification Program will prepare students for entry-level positions in the construction industry, thereby supporting the first of the LCC Missions and guiding principles.

2.3.2 This program provides the first steps into a career that offers endless employment and educational possibilities, varying from apprenticeships, journeyman, and master carpenter certification, all the way through Doctoral degrees in Construction Management, Architecture, and various types of Engineering. This also falls in line with several other of Luna Community College's Mission principles, by assisting students in gaining equitable

accessibility to educational opportunities, as well as providing successful students with the certification(s) necessary to obtain gainful employment, thus enabling them to be a benefit to the communities of northeastern New Mexico or elsewhere.

2.4 Relationship to other Luna Community College Vocational Programs

This program will increase the strengths of Luna Community College by adding the first nationally recognized certification opportunity to the vocational and technological trades programs and certifications currently in place at Luna Community College. This program will also provide the core curriculum stepping stones for basic electrical and plumbing certification programs. The program is also enhanced by approved elective courses offered by LCC, such as Alternative Building Construction, Welding, Cabinet-Making, and Computer Use for Technologies, Principles of Small Business Management, and Business Law.

2.4 Relationship to Programs Offered at Other New Mexico Colleges and Universities

This program is unique in that no other secondary or institution of higher education in the state of New Mexico presently offers NCCER certification in a building technologies vocational program. This program is enhanced by including collegiate classroom and laboratory settings at the same institution.

2.5 Opportunities for Future Advancement

2.5.1 The journeyman trades student, is more likely than any other construction trades worker to become very knowledgeable about many trades and aspects of the building industry. This makes carpentry trades work both interesting and challenging. The building technologies also offer a great variety of future career opportunities, including supervisors, safety managers, project managers, architects, general contractors, contractor/owners. Students may even pursue advanced degrees in the building trades and technologies, i.e. Doctoral degrees in Architectural Engineering or Construction Management.

2.5.2 Journeyman trades students, like any trades or professional students, should recognize that a career is a life-long learning process. To be an effective journeyman, one must keep up-to-date with new tools, materials, methods, and building codes and regulations. Should a person choose to work their way into construction management, or to one day start their own construction business, they must learn appropriate management and administrative skills, in addition to keeping their skills sharp and current. Every successful manager and business owner began the same way, by becoming educated and acquiring the necessary skills to succeed. These successful people also have one important trait in common: the desire and willingness to continue learning and polishing their skills. In the construction field, the learning process typically begins with apprentice training.

2.5.3 As a worker's trade skills become more developed and more experience is gained, they will likely encounter opportunities to earn greater wage compensation as they progress from journeyman to foreman, supervisor, project manager, etc. There are great financial incentives for learning and growing within the construction trades. However, no one ever reaches the top without first learning the basics, no matter what the vocation.

2.6 Opportunities for Employment

According to the Authorization Team of Prentice Hall Publishing and the NCCER, the construction industry employs more personnel and contributes more to our nation's economy than any other industry, both historically and currently. Our society will always have the necessity for new homes, roads, airports, schools, hospitals, factories, office buildings, and numerous other types of structures, all built by multiple branches of the construction industry. Despite inevitable economic ups and downs, there will always be a valid source of well-paying jobs and career opportunities for carpenters and other construction trade professionals.

2.7 Program Outcomes Assessment

As a construction worker, it is possible for a carpenter to progress from apprentice through several levels and degrees, including administration, management, and specialty positions within the field.

2.7.1 The Journeyman certification program expects the following student learning outcomes:

- Utilize drawings to layout the projected structure on the site.
- Use drawings and specifications to perform a takeoff of materials needed for project construction.
- Assemble/construct the structure with the use of hand and power tools.
- Knowledge of applicable safety procedures and regulations.
- Knowledge of appropriate construction mathematics necessary to assemble projects.
- Ability to efficiently and appropriately plan and schedule work.
- Knowledge of appropriate methods of checking work with the use of levels, rules, and squares.
- Ability to safely use powder activated and pneumatic tools.
- Basic introduction to light construction equipment.

2.7.2 Suggested techniques for assessing the expected outcomes:

The prescribed training will provide an analysis of each participant's knowledge by task area. In order to provide an effective means for upgrading training, task areas reflected in the training prescription are linked directly to the modules from NCCER's *Contren Learning Series*. This assessment incorporates only those modules that are critical in determining an individual's competence. Because all modules from a curriculum will not be reflected in an individual participant's training prescription, careful consideration and counseling should be given to each participant to determine an effective individual development plan.

Administrators and Coordinators should provide counseling and guidance for each participant. The desired result is an individual development plan that is

based on the information contained in the training prescription. In particular cases, the individual development plan may incorporate module(s) from the curriculum that are not reflected in the assessment, to ensure effective training for each participant.

Additional suggested techniques for assessing the expected outcomes are as follows:

- Review and evaluation of the curriculum at least every two years by an advisory body and participating discipline faculty.
- Review and track employment and continued education of program graduates.
- Set up a construction-oriented advisory body to evaluate the program and provide feedback regarding program graduates.
- Require students to satisfactorily complete a capstone course, an overview of the Building Technology Vocational Program. Testing will include a standardized test of in-field operations, alongside of completed coursework and the Capstone Written Final Examination.

3.0 Resource Requirements

3.1 Existing Faculty

The faculty for the Building Technology Program with NCCER Journeyman Instructor Certifications currently consists of one NCCER certified Core Curricula, Carpentry, Concrete Finishing, and Construction Site Safety Master Instructor: Joseph J. Montoya Department Head is also a OSHA #500 Authorized Outreach Construction Trainer.

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3.4 New Faculty

When the time occurs that the program's enrollment meets or exceeds current expectations, i.e. more than fifteen students per NCCER certified course, an additional NCCER certified instructor would be required for this program to continue to meet NCCER accreditation guidelines.

3.5 Library Resources

3.3.1 At the present time, the library at LCC houses only a very small number of books dedicated to the building trades and no construction-related periodicals. However, the library is currently in the process of increasing its number and quality of research materials for the building technologies vocation. In addition, the library has interlibrary loan affiliations with all of New Mexico's universities, as well as many more universities and colleges nationwide. LCC students also have access to the nearby Donnelly Library at New Mexico Highlands University and the Carnegie Library (a local, public facility).

3.3.2 NCCER-Certified instructors have access to additional teaching resources and materials both digital/online through the NCCER and the Contren Learning Series Websites, as well as access to hard-copy resources for instructors and students through the NCCER catalog. In addition, certified instructors have physical access to the AGC library in Albuquerque, NM for a wide array of books, periodicals, and other teaching resources related to the construction industry

3.6 Equipment

The LCC Building Technologies program must provide students and faculty access to safe and modern training equipment, if this programs is to be competitive and reach its proposed objectives. In addition to the current equipment inventory available at the Building Technologies Department, several more essential pieces of equipment are necessary. These items include, but may not be limited to, saws, levels, compressor, air hoses, various pneumatic nailers, various drills, concrete tools and associated equipment, and possibly other items unforeseen at this time. Another requirement for the program is the appropriate computer software, i.e. Contren Connect E-Books, various computer testing software, media tools, and access to the Contren Connect Online Courses with their associated Instructor Tools. As the program expands, additional upgrading of both computer and building tools and equipment will become necessary. In order to maintain a properly functioning and successful program, the aforementioned equipment requirements and additions will be essential.

4.0 Other

4.1 Projected Enrollments

4.1.1 The public and student interest in the construction industry is relatively high. Craft training via the Bureau of Apprenticeship Training (BAT) has not been changed for thirty years, which is believed to be one reason for the lack of use of this program in the construction industry.

4.1.2 NCCER is an independent, private educational foundation, founded and funded by the construction industry, to solve the training problem currently plaguing the construction industry. The basic intent of the NCCER is to supplant governmental control and credentialing of the construction workforce in this nation with industry-driven training and education programs, which departs from traditional classroom learning and has adopted a pure competency-based training regimen. There is a continuing necessity for contractors to employ journeymen to qualify them to even bid on certain commercial projects.

4.1.3 In conclusion, the classroom instruction required for journeyman certification is 144 hours per year, with an On-Job-Training (OJT) requirement of 2,000 hours. The typical BAT program requires 576

classroom training hours and 8,000 OJT hours. Thus, the NCCER program is more efficient and more attractive to prospective students, as it provides equivalent or more training and certification in a two-year program than the typical BAT four-year program. For this reason, by making this program available at LCC, we expect projected enrollments to be high and to surpass previous LCC building trades enrollments.

4.1.4 The NCCER-certified Building Technologies Program at LCC expects to attract perspective students from several regions and backgrounds, by recruiting new students from area high schools, as well as employees of local and regional construction firms and general contractors. Recruiting methods will include, but are not limited to, regional newspaper and radio advertising, creating and distributing brochures to market the program, and personal visits to schools and employers by LCC Building Technologies Program instructors.

4.1.5 Considering the addition of this nationally-recognized certification program to our region, as well as the aforementioned industry needs as outlined above, enrollment in the LCC Building Technologies Program is expected to meet or exceed fifteen to twenty students per level of the program at any given time.

4.1.6 It is anticipated that ten (10) current students of the program will graduate at the end of the fall semester of 2010. Due to lack of past recruiting and slow program implementation, only five (5) program students are expected to graduate at the end of the fall semester of 2011. However, the program is only in its second year at this time, and we expect with more diligent recruiting and increased and updated marketing methods, that enrollment numbers will only continue to increase, thereby increasing future graduation numbers as well.

4.2 Date of Program Implementation

This LCC Building Technologies Vocational Program has been implemented as of the first day of the fall semester of this year, which began on August 17th, 2009.

BUILDING TECHNOLOGY (BT)

BT112 Building Construction I 3;(3,0)

This course will include methods, procedures, and terms used in foundation, footing, and stem wall construction as well as lessons on structural material for floor, walls, and roof systems in accordance with the UBC. *Corequisite: VOC109.*

Learning Outcomes:

- Identify various types building materials, fasteners, adhesives, and explain their uses:
- Identify with the hand and power tools commonly used by carpenters, and describe their uses while following general safety rules and guidelines:
- Identify and demonstrate the process of reading plans and evaluations:
- Describe and identify with layout procedures, and the different types of floor systems:
- Describe and identify with layout procedures for different types of wall, ceiling, and roof framing systems:
- Describe and identify the various types of concrete, reinforcing materials, forms, and estimating methods used in the industry.
- Describe and identify with the various windows, exterior doors, and basic stair systems :

BT113 Building Construction Application I 4;(0,8)

This course includes the hands-on application of foundation, footing, and stem wall construction as well as cutting and assembly of structural material for floor, walls, and roof systems in accordance with the UBC. Safety is stressed! *Corequisite: 8T112.*

Learning Outcomes

- Describe and demonstrate the ability to properly install various types building materials, fasteners, and adhesives, while following proper safety precautions and procedures:
- Describe and operate the different hand and power tools commonly used by carpenters while following general safety rules and guidelines:
- Identify and demonstrate the process of reading plans and evaluations:
- Describe and demonstrate the ability to layout and construct different type of floor systems:
- Describe and demonstrate the ability to layout and construct different types of wall, ceiling, and roof framing systems:
- Describe and identify the various types of concrete, reinforcing materials, forms, and estimating methods used in the industry.
- Identify, and demonstrate the ability to install various window, door, and a basic stair systems:

BT114 Building Construction II 3;(3,0)

This course includes the study of trade practices for the installation of exterior wall and roof finishes as well as windows and exterior doors in accordance with the UBC. Students will study about insulation, drywall, taping and texturing, as well as other interior finish work. *Prerequisite: BT113.*

Learning Outcomes

- Learn and identify the types and uses of drawing prepared for commercial structures, including content and format
- Learn and identify common procedures used in residential and commercial roofing applications, while following the UBC and OSHA guidelines and regulations.
- Learn and Learn and identify with standard format for specifications, and their conveying of specific construction requirements. identify the requirements for insulation, moisture control, vapor barrier, ventilation, and waterproofing materials.
- Learn and identify the installation procedures of various types of exterior siding:
- Learn and identify the components of a steel framing systems including wall layout:
- Learn and identify the different types of drywall and their appropriate usages and explain the fastener schedule for different types of drywall installations. Learn procedures for single-layer and multi-layer drywall installations using different types fastening systems:
- Learn and identify with related hardware, such as locksets and door closures. Learn installation procedures for metal doors, wooden doors, folding doors, and pocket doors.
- Learn and identify with materials, layout, and installation procedures for many types of suspended ceilings used in commercial construction, as well as ceiling tiles, drywall suspension systems, and pan-type ceilings
- Identify the parts of window and door installation; install a pre-hung window and pre-hung door.
- Learn and identify with procedures for selecting, cutting, and fastening trim. Learn the procedures for installation of base and wall cabinets, and countertops:

BT115 Building Construction Application II 4;(0,8)

This course provides the hands-on experience of trade practices, which includes the installation of exterior wall, and roof finishes as well as windows and exterior doors in accordance with the UBC. Course also provides hand-on activities in a safety-focused environment: insulation techniques, drywall installation, taping and texture of drywall, trim work and other finish work.
Corequisite: BT114.

Learning Outcomes

- Learn and identify with the standard format for specifications, and their conveying of specific construction requirements. identify the requirements for insulation, moisture control, vapor barrier, ventilation, and waterproofing materials.
- Describe, and demonstrate common procedures used in residential and commercial roofing, while following the UBC and OSHA guidelines and regulations.
- Describe and demonstrate the proper procedures for installation of a moisture control vapor barrier, insulation, ventilation, and waterproofing materials while following safety guidelines and regulations.

- Learn, identify, and install components of a steel framing systems, including wall layout, and the framing procedures for installing structural and non-structural studs in wall openings, including bracing, and blocking.
- Learn, identify, and demonstrate installation procedures of various types of exterior siding.
- Learn, identify and demonstrate installation procedures and requirements for materials, tools, and methods used to finish and patch gypsum drywall, including coverage of both automatic and manual taping and finishing tools.
- Learn, identify, and demonstrate the procedures for installation of doors and related hardware in steel-framed, wood-framed and masonry walls.
- Learn, identify, and demonstrate with procedures for selecting, cutting, and fastening of various trims.
- Learn and identify the materials, tools, and methods used in cabinetmaking. Demonstrate the use of various joining techniques made on stationary power tools.

VOC109 Fundamentals of Vocational Education 4:(2,4)

This is a comprehensive course combining theory and classroom participation in common trade practices, which include work ethics, practical math review, safety, building permits, building codes, hand/power tools and building materials lumber selection, use and cost estimates. Lab will include the use and maintenance of hand and power tools with an emphasis on safety.

Learning Outcomes

- Identify the role of OSHA in job-site safety
- Recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them
- Recognize and identify some of the basic hand and power tools used in construction industry, and demonstrate their proper uses.
- Identify and recognize basic construction drawing terms, components, and symbols.
- Identify and describe the use of slings and common rigging hardware, and demonstrate proper use of American National Standards Institute (ANSI) hand signals.
- Demonstrate critical communication skills, thinking skills, and the ability to solve problems using those skills.
- Identify and choose appropriate materials-handling techniques.

VOC117 Blueprint Reading and Construction Math 4:(2,4)

This course will cover site layout, zoning rules and regulations in preparing a building site according to specifications. Course will be incorporating construction math for a variety of construction uses. Students will interpret and implement architectural drawings, following state and local codes.

Learning Outcomes

- Identify and describe what various sections are included in a set of construction drawings

- Demonstrate the ability to calculate areas and volumes of objects
- Describe and demonstrate the ability to make measurements using an architect's scale and an engineer's scale.
- Identify and describe what is included in a set of specifications, and explain why they are needed.
- Describe the fundamentals of green building, and identify the variety of basic materials used in this type of construction.
- Identify and understand the symbols, notations, abbreviations, and schedules associated with construction drawings.
- Demonstrate the ability to work with drawings to obtain information on dimensions, finishes, details, area calculations, in order to make material estimates.

BT130 Basic Plumbing Principles 4:(2,4)

This course will include the introduction to basic use of tools and equipment used in plumbing and basic design for proper rough in, water, vent, and potable water.

Learning Outcomes

- Identify the stages of progress within the plumbing profession and its positive impact on society
- Identify job-site hazardous work specific to plumbers
- Interpret plumbing-related information from a set of plumbing drawings and calculate end-to-end measurements using fitting allowances and thread makeup
- Identify and explain proper and improper applications of plastic piping
- Properly measure, ream, cut, and join copper piping
- Properly measure, cut, and join cast-iron piping
- Properly measure, cut, groove, thread, and join carbon steel piping
- Properly measure, cut, join, and groove corrugated stainless steel tubing
- Identify the basic types of sinks, bath-shower modules, toilets, drinking fountains, garbage disposals, and dishwashers
- Identify the major components of a drain, waste, and vent (DWV) system
- Describe the process by which water is distributed in municipal, residential, and private water systems

BT142 Building Construction III 4;(2,4)

Previously offered as STVE125.

This course provides students with hands-on experience performing safety inspections on equipment, as well as procedures utilized in rigging operations. Students will also learn footings, slabs, stem walls, vertical and horizontal framework, and tilt-up wall systems. In addition, students will study properties and reinforcing of concrete. *Prerequisite: BT115.*

Learning Outcomes

- Describe and identify with different types of concrete and how calculate concrete volume requirements for rectangular and cylindrical structures using formals and/or calculations;
- Recognize and identify the bar bends standardized by the American Concrete Institute (ACI); Safely use selected tools and equipment to hand-cut and install reinforcing materials;
- Identify and describe the usage of a screed to strike off and level concrete, and how to use appropriate tools for placing, floating and finishing concrete;
- Describe and explain safety considerations for trenches and deep excavations; Also identify ways to increase soil density;
- Identify various types of footings and foundations, lay-out and construct a selected footings and foundation, using an established gridline;
- Identify the components of each and/or all types of vertical and horizontal form systems;
- Demonstrate the different methods for forming and installing tilt-up wall panels

BT143 Building Construction Application III 4;(0,8)

Previously offered as STVE135.

This course provides students with hands-on experience performing safety inspections on equipment, as well as procedures utilized in rigging operations. Students will also learn footings, slabs, stem walls, vertical and horizontal framework, and tilt-up wall systems. In addition, students will study properties and reinforcing of concrete. *Corequisite: BT142*

Learning Outcomes

- Identify and describe the use of different types of concrete. Calculate concrete volume requirements for rectangular and cylindrical structures using formals and/or calculations.
- Recognize and identify the bar bends standardized by the American Concrete Institute (ACI); Safely use selected tools and equipment to hand-cut and install reinforcing materials; Demonstrate usage of a screed to strike off and level concrete, and demonstrate how to use appropriate tools for placing, floating and finishing concrete;
- Demonstrate usage of a screed to strike off and level concrete, and demonstrate how to use appropriate tools for placing, floating and finishing concrete;
- Demonstrate and identify safety considerations for trenches and deep excavations during shoring procedures; Also demonstrate ways to increase soil density
- Indentify various types of footings and foundations, lay-out and construct selected footings and foundations, using an established gridline;
- Identify and install components of each and/or all types of vertical and horizontal form systems
- Demonstrate the different methods for forming and installing tilt-up wall panels**.**

BT154 Building Construction IV 4;(2,4)

Previously offered as STVE131.

In this course students will learn actual construction site layout and site preparation. Students will be introduced to more complex systems involved in roof, wall, and stair installations, in preparation for possible advancement into supervisory roles early in their careers, students will also be introduced to and instructed in management skills and techniques.

Learning Outcomes

- Interpret and utilize site/plot plan drawings, lay-out of building foundation lines, and determine elevations by trigonometric leveling.
- Identify with the characteristics and properties of materials as they relate to roofing, walls, and stair system applications
- Identify various pieces of light equipment commonly used on a construction site: Learn the general safety, operation, and maintenance procedures used for each type of equipment covered
- Identify the factors to consider when selecting electrodes, and identify and state the characteristics of a good weld
- Identify with materials and methods used to finish interior and exterior applications of commercial buildings.
- Discuss current issues and organizational structures in the construction industry today, and demonstrate an awareness of safety issues, including the cost of accidents, and safety regulations.

also be introduced to and instructed in management skills and techniques. *Prerequisite: 8T143*vill

BT155 Building Construction Application IV 4;(0,8)

Previously offered as *STVE141.*

In this course, students will learn actual construction site layout and site preparation. Students will be introduced to more complex systems involved in roof, wall, and stair installations. In preparation for possible advancement into supervisory roles early in their careers, students will also be introduced to and instructed in management skills and techniques. *Corequisite: BT154.*

Learning Outcomes

- Use manual or electronic equipment and procedures to make distance measurements and perform site layout.
- Identify with the characteristics and properties of materials as they relate to roofing, walls, and stair system applications; Explain and demonstrate proper procedures for installing various roofing, wall, and stair systems;
- Identify with the characteristics and properties of materials as they relate to roofing, walls, and stair system applications: Operate selected items of light equipment:
- Under the supervision of the instructor demonstrate the ability to perform a basic welding procedure:
- Identify materials and demonstrate methods to finish interior and exterior applications of commercial buildings
- Understand and incorporate leadership skills into work habits, including communication, motivation, team building, problem solving, and decision making

BT207 International Building Code 4:(2,4)

This course provides minimum requirements to safeguard the public health, safety and general welfare of the occupants of new buildings and structures. It addresses structural strength, means of egress, sanitation, adequate lighting, ventilation, accessibility and energy conservation.

Learning Outcomes

- Identify and describe the scope of administration and definitions within the IBC code.
- Identify and describe the special requirements for specific occupancies or elements.
- Identify and describe the height and area limitations based on type of construction.
- Indentify and describe the fire resistance and protection requirements**.**
- Identify and describe the requirements for evacuation.
- Identify and describe the specific requirements to allow use and access to building for persons with disabilities.
- Identify and describe the building systems, such as lighting, HVAC, plumbing fixtures, elevators.
- Identify and describe with the structural components-performance and stability.
- Identify and describe encroachment outside of property lines.
- Identify and describe with safeguards during construction.
- Identify and describe the existing building allowances
- Identify and describe with referenced code standards.

BT215 Concrete Finishing I 4;(2,4)

This course will include methods, procedures, and terms used in concrete finishing. Students will learn to prepare to place, apply different finishes, and learn the different curing and protecting methods of concrete. Properties, tools, equipment, and troubleshooting of concrete are also covered, while following OSHA guidelines and regulations and the Uniform Building Code (UBC).

Learning Outcomes

- Identify and utilize methods and techniques for constructing concrete structures.
- Learn and identify with all OSHA Safety Requirements
- Identify and describe how the properties of concrete are used in the construction industry
- Identify and demonstrate proper operation of both hand tools and power equipment used in the trade
- Describe and demonstrate the methods and procedures for properly preparing structures for the placing of concrete
- Identify with the requirements and demonstrate proper methods for placing of concrete
- Identify and properly estimate concrete quantities for ordering from a batch plant
- Describe a basic troubleshooting methodology that can be used to identify a variety of concrete construction problems and their causes

BT231 Concrete Finishing II 4;(2,4)

This course will take mare in depth look at methods, procedures and terms used in concrete finishing. Students will learn to prepare, to place, apply architectural finishes, and learn the different curing and protecting methods of concrete. Students will learn typical components and admixtures and their affects to concrete mix design and select the right tool for the right application. The student wil! also understand the basics of rub and patch. A!! will be done while following OSHA guidelines and regulations and Uniform Building Code (UBC). *Prerequisite: BT215.*

Learning Outcomes

- Describe and identify with the physical and chemical properties of various materials used in a concrete mix.
- Describe and identify with methods and techniques used in estimating materials quantities for concrete construction
- Learn and identify with techniques for forming, constructing, and finishing various types of site work.
- Identify with methods and procedures for construction of sidewalks and driveways, and vertical structures.
- Describe and identify with the four types architectural concrete, and the various architectural finishes and surface treatments.

BT232 Concrete Finishing Application II 4;(2,4)

This course will present construction and finishing techniques used in industrial concrete floor work. Students will learn requirements used for construction of Superflat Floors to include surface treatments and quality control procedures for sampling and testing of concrete mixes. Course will also cover requirements for making repairs to concrete based on specific problems. All will be done while following OSHA guidelines and regulations and Uniform Building Code (UBC). *Corequisite: BT231.*

Learning Outcomes

- Prepare a floor area for the placing and finishing of concrete for an industrial floor system.
- Prepare an area for installing, placing, and finishing of a superflat floor system.
- Describe and demonstrate the finishing processes of a concrete floor which is receiving toppings, and a surface treatment.
- Describe the purpose, and frequency, sampling requirements, and procedures for performing common concrete test
- Describe and locate common surface defects, cracks, and delaminations

FCMK100 Introduction to Furniture and Cabinet-Making 3:(2,2)

This course is designed for the beginner and includes the basic rules for the care and safe use of hand and power tools, lumber selection, adhesives, and cost estimating. Students will provide their own material and personal safety glasses to construct a small wood project.

Learning Outcomes

- Identify and recognize the common types of woods used to make cabinets.
- Describe and identify various types of joints used in cabinetmaking.
- Describe the differences between traditional, provincial, and contemporary designs.
- Correctly and safely, use stationary power tools to cut various types of joints used in cabinetmaking.
- Demonstrate the ability to construct a small-scale wood project using various cabinetmaking joints and procedures.

FCMK104 Planning Layout and Design 3:(2,2)

In this course, students will define and apply elements of design, line, shape, mass, color, tone, texture, to a small project in accordance with design standards, design acceptance, and practical applications. Safety is stressed in accordance with OSHA guidelines and procedures.

Learning Outcomes

- Identify needs and wants for a cabinet and furniture in everyday living.
- Describe the difference between the function and form for furniture and cabinetry.
- Identify and follow steps of the decision-making process by choosing materials that will fulfill the design criteria.
- Identify and design furniture and cabinetry that is convenient and flexible.
- Apply design elements and principles to create functional and attractive furniture and cabinetry.

FCMK118 Advanced Furniture Design 3:(2,2)

This course is an advanced design course for students who have had prior experience making their own furniture. Students will design and construct at least one creative piece of furniture.
Prerequisites: FCMK100, FCMK104.

Learning Outcomes

- Identify needs and wants for furniture in everyday living.
- Describe the difference between the function and form for furniture.
- Identify and follow steps of the decision-making process by choosing materials that will fulfill the design criteria.
- Identify and design furniture and that is convenient and flexible.
- Apply design elements and principles to create functional and attractive furniture.

FCMK130 Advanced Woodworking Projects 3:(1,4)

This capstone course includes advanced projects in Furniture and Cabinetmaking approved by the instructor with an emphasis on safety by following OSHA guidelines and procedures.
Prerequisite: FCMK100, FCMK, 104, FCMK118.

Learning Outcomes

- Identify and describe with the types of sketches used to design furniture and cabinetry.
- Demonstrate and apply techniques of sketching to draw isometric, cabinet, furniture, and perspective sketches.
- Identify and list standard dimensions for cabinets and furniture.
- Design, layout, construct, and install a selected cabinet component.
- Design, layout, and construct a selected piece of furniture.