**2013 – 2014**

# Florida Department of Education

# Curriculum Framework

## Program Title: Building Trades and Construction Design Technology

## Program Type: Career Preparatory

## Career Cluster: Architecture & Construction

## 

|  | **Secondary** | **PSAV** |
| --- | --- | --- |
| Program Number | 8722000 | C100100 |
| CIP Number | 0646040106 | 0646040106 |
| Grade Level | 9-12, 30, 31 | 30, 31 |
| Standard Length | 6 Credits | 900 Hours |
| Teacher Certification | BLDG MAINT @7 7G  TROWEL TR @7 7G  PLUMBIN @7 7G  ELECTRICAL @7 7G  AC HEAT MC @7 7G  BLDG CONST @7 7G  DRAFTING @7 7G  SHEETMETAL @7 7G  TECH ED 1@2  TEC CONSTR @7 7G  CARPENTRY @7 7G  TEC DRAFT 7G  ROOFING 7G  ENG 7G  WOODWORKIN @4 | BLDG MAINT @7 7G  TROWEL TR @7 7G  PLUMBIN @7 7G  ELECTRICAL @7 7G  AC HEAT MC @7 7G  BLDG CONST @7 7G  DRAFTING @7 7G  SHEETMETAL @7 7G  TECH ED 1@2  TEC CONSTR @7 7G  CARPENTRY @7 7G  TEC DRAFT 7G  ROOFING 7G  ENG 7G  WOODWORKIN @4 |
| CTSO | SkillsUSA | SkillsUSA |
| SOC Codes (all applicable) | 49-9071 - Maintenance and Repair Workers, General | 49-9071 - Maintenance and Repair Workers, General |
| Facility Code | 245 - <http://www.fldoe.org/edfacil/sref.asp> (State Requirements for Educational Facilities) | |
| Targeted Occupation List | <http://www.labormarketinfo.com/wec/TargetOccupationList.htm> | |
| Perkins Technical Skill Attainment Inventory | <http://www.fldoe.org/workforce/perkins/perkins_resources.asp> | |
| Industry Certifications | <http://www.fldoe.org/workforce/fcpea/default.asp> | |
| Statewide Articulation | <http://www.fldoe.org/workforce/dwdframe/artic_frame.asp> | |
| Basic Skills Level | N/A | Mathematics: 9  Language: 9  Reading: 9 |

## Purpose

The purpose of this program is to prepare students for employment or advanced training in the building construction industry.

## This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Architecture & Construction career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Architecture & Construction career cluster.

## Program Structure

This program is a planned sequence of instruction consisting of four occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at each occupational completion point may either continue with the training program or terminate as an occupational completer.

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

| OCP | Course Number | Course Title | Course Length | SOC Code |
| --- | --- | --- | --- | --- |
| A | BCV 0080 | Building Construction Assistant | 450 Hours | 49-9071 |
| B | BCV 0081 | Carpentry and Masonry Technician | 150 Hours | 49-9071 |
| C | BCV 0082 | Electrical and Plumbing Technician | 150 Hours | 49-9071 |
| D | BCV 0083 | A/C and Painting Technician | 150 Hours | 49-9071 |

The following table illustrates the **Secondary** program structure:

| OCP | Course Number | Course Title | Length | SOC Code | Level |
| --- | --- | --- | --- | --- | --- |
| A | 8722010  8722020  8722030 | Building Trades and Construction Design Technology 1  Building Trades and Construction Design Technology 2  Building Trades and Construction Design Technology 3 | 1 Credit  1 Credit  1 Credit | 49-9071 | 2  2  2 |
| B | 8722040 | Building Trades and Construction Design Technology 4 | 1 Credit |  | 2 |
| C | 8722050 | Building Trades and Construction Design Technology 5 | 1 Credit | 49-9071 | 2 |
| D | 8722060 | Building Trades and Construction Design Technology 6 | 1 Credit | 49-9071 | 2 |

## Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

## Special Notes

### Career and Technical Student Organization (CTSO)

SkillsUSA, Inc. is the appropriate career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

### Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

### Essential Skills

Essential skills identified by the Division of Career and Adult Education have been integrated into the standards and benchmarks of this program. These skills represent the general knowledge and skills considered by industry to be essential for success in careers across all career clusters. Students preparing for a career served by this program at any level should be able to demonstrate these skills in the context of this program. A complete list of Essential Skills and links to instructional resources in support of these Essential Skills are published on the CTE Essential Skills page of the FL-DOE website (<http://www.fldoe.org/workforce/dwdframe/essential_skills.asp>).

### Basic Skills

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

### Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student’s IEP or 504 plan or postsecondary student’s accommodations plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their postsecondary service provider. Accommodations received in postsecondary education may differ from those received in secondary education.  Accommodations change the way the student is instructed.  Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems.  Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (ESE) will need modifications to meet their special needs.  Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course.  Note postsecondary curriculum cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP).  If needed, a student may enroll in the same career and technical course more than once.  Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP.  The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP.  After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately.  The district’s information system must be designed to accept multiple credits for the same course number (for eligible students with disabilities).

### Articulation

The PSAV component of this program has no statewide articulation agreement approved by the Florida State Board of Education.  However, this does not preclude the awarding of credits by any college through local agreements.

For details on statewide articulation agreements which correlate to programs and industry certifications, refer to <http://www.fldoe.org/workforce/dwdframe/artic_frame.asp>.

### Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida’s Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at <https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx>.

### Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation.  A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

## Standards

After successfully completing this program, the student will be able to perform the following:

1. Follow safety practices and disaster plans.
2. Demonstrate an understanding of the built environment.
3. Demonstrate an understanding of the construction industry and related occupations.
4. Identify and use basic hand tools.
5. Identify and use power tools and equipment.
6. Solve problems using critical thinking skills, creativity and innovation.
7. Describe the importance of professional ethics and legal responsibilities.
8. Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
9. Use oral and written communication skills in creating, expressing and interpreting information and ideas.
10. Use information technology tools.
11. Research construction components, materials, hardware, and characteristics.
12. Demonstrate language arts knowledge and skills.
13. Read blueprints, contract documents and specifications.
14. Explain the importance of employability and entrepreneurship skills.
15. Apply building codes and regulations to the preparation of CAD drawings and construction documents.
16. Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
17. Demonstrate rough carpentry skills.
18. Demonstrate finish carpentry skills.
19. Demonstrate masonry skills.
20. Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
21. Demonstrate electrical rough in skills.
22. Demonstrate finish electrical skills.
23. Demonstrate plumbing rough in skills.
24. Demonstrate finish plumbing skills.
25. Demonstrate personal money-management concepts, procedures, and strategies.
26. Demonstrate air conditioning rough in skills.
27. Demonstrate finish air conditioning skills.
28. Demonstrate painting and decorating skills.
29. Demonstrate science knowledge and skills.
30. Demonstrate mathematics knowledge and skills.
31. Demonstrate design technology, building trades, and construction management skills.

Note: Outcomes 09.0, 29.0 and 30.0 are intended to be taught throughout the program and do not need to be taught as discreet lessons. Outcome 31.0 is a capstone project designed to integrate all of the competencies of the previous 30 outcomes.

**2013 – 2014**

# Florida Department of Education

# Student Performance Standard

## Program Title: Building Trades and Construction Design Technology

## PSAV Number: C100100

## Course Number: BCV 0080

## Occupational Completion Point: A

## Building Construction Assistant – 450 Hours – SOC Code 49-9071

1. Follow safety practices and disaster plans--The student will be able to:
   1. Comply with all applicable Occupational Safety and Health Administration (OSHA) rules and regulations.
   2. Examine Material Safety Data Sheets (MSDS) and follow the procedures as necessary.
   3. Analyze and discuss the “Right-to-Know” Law as recorded in (29 CFR-1910.1200)
   4. Identify and use safety equipment.
   5. Analyze and follow disaster plans.
2. Demonstrate an understanding of the built environment--The student will be able to:
   1. Assess the development of construction technology, its impact on the built environment and the impact of growth on the construction industry.
   2. Assess the benefits of the construction industry on health and safety, communication, transportation, and the economy.
   3. Examine the relationship between construction and the environment.
   4. Debate the role of trade unions in the construction industry.
   5. Examine the role of apprenticeship in the construction industry.
   6. Determine the different classifications of construction projects.
   7. Compare and contrast the roles and responsibilities of the general contractor, specialty contractor, construction management, and design build firms.
3. Demonstrate an understanding of the construction industry and related occupations--The student will be able to:
   1. Survey construction trade occupations and the roles and responsibilities of each craft.
   2. Survey construction management occupations and the roles and responsibilities of each.
   3. Survey design and engineering occupations and the roles and responsibilities of each.
   4. Assess the relationship between construction and the economy.
   5. Examine the process of applying for building permits and variances.
   6. Assess the need for, and impact of, zoning requirements on construction projects.
4. Identify and use basic hand tools--The student will be able to:
   1. Select and utilize appropriate hand tools typically used in the construction industry for specific tasks in accordance with safety guidelines.
5. Identify power tools and describe their proper operation--The student will be able to:
   1. Select and utilize appropriate power tools and equipment typically used in the construction industry for specific tasks in accordance with safety guidelines.
6. Solve problems using critical thinking skills, creativity and innovation--The students will be able to:
   1. Employ critical thinking skills independently and in teams to solve problems and make decisions. PS1.0
   2. Employ critical thinking and interpersonal skills to resolve conflicts. PS2.0
   3. Identify and document workplace performance goals and monitor progress toward those goals. PS3.0
   4. Conduct technical research to gather information necessary for decision-making. PS4.0
7. Describe the importance of professional ethics and legal responsibilities--The students will be able to:
   1. Evaluate and justify decisions based on ethical reasoning. ELR1.0
   2. Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies. ELR1.1
   3. Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace. ELR1.2
   4. Interpret and explain written organizational policies and procedures. ELR2.0
8. Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives--The students will be able to:
   1. Employ leadership skills to accomplish organizational goals and objectives. LT1.0
   2. Establish and maintain effective working relationships with others in order to accomplish objectives and tasks. LT3.0
   3. Conduct and participate in meetings to accomplish work tasks. LT4.0
   4. Employ mentoring skills to inspire and teach others. LT5.0
9. Use oral and written communication skills in creating, expressing and interpreting information and ideas--The students will be able to:
   1. Select and employ appropriate communication concepts and strategies to enhance oral and written communication in the workplace. CM1.0
   2. Locate, organize and reference written information from various sources. CM3.0
   3. Design, develop and deliver formal and informal presentations using appropriate media to engage and inform diverse audiences. CM5.0
   4. Interpret verbal and nonverbal cues/behaviors that enhance communication. CM6.0
   5. Apply active listening skills to obtain and clarify information. CM7.0
   6. Develop and interpret tables and charts to support written and oral communications. CM8.0
   7. Exhibit public relations skills that aid in achieving customer satisfaction. CM10.0
10. Use information technology tools--The students will be able to:
    1. Use Personal Information Management (PIM) applications to increase workplace efficiency. IT1.0
    2. Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications. IT2.0
    3. Employ computer operations applications to access, create, manage, integrate, and store information. IT3.0
    4. Employ collaborative/groupware applications to facilitate group work. IT4.0
11. Research construction components, materials, hardware, and characteristics--The student will be able to:
    1. Research the various components; materials and hardware used in residential construction applications.
    2. Research the various components; materials and hardware used in commercial construction applications.
    3. Research the various components, materials and hardware used in industrial construction applications.
    4. Compare and contrast the components, materials and hardware used in residential, commercial and industrial construction applications.
12. Demonstrate language arts knowledge and skills--The students will be able to: AF2.0
    1. Locate, comprehend and evaluate key elements of oral and written information. AF2.4
    2. Draft, revise, and edit written documents using correct grammar, punctuation and vocabulary. AF2.5
    3. Present information formally and informally for specific purposes and audiences. AF2.9
13. Read contract blueprints, documents and specifications--The student will be able to:
    1. Determine the purpose and components of contract documents and specifications.
    2. Analyze the importance of building codes, and zoning regulations on the development of blueprints and specifications.
    3. Incorporate the following elements in the development of blueprints and specifications:
       1. Dimensions
       2. Construction views
       3. Section views
       4. Site plans
       5. Foundation plans
       6. Floor plans and elevations
       7. Details and schedules
       8. Wiring details
       9. Plumbing details
       10. Mechanical details
    4. Utilize building symbols in the development of blueprints.
    5. Prepare lists of materials and specifications.
    6. Use architectural and engineering scales.
    7. Demonstrate the basic use of computer-aided design software.
14. Explain the importance of employability and entrepreneurship skills--The students will be able to:
    1. Identify and demonstrate positive work behaviors needed to be employable. ECD1.0
    2. Develop personal career plan that includes goals, objectives, and strategies. ECD2.0
    3. Examine licensing, certification, and industry credentialing requirements. ECD3.0
    4. Maintain a career portfolio to document knowledge, skills, and experience. ECD5.0
    5. Evaluate and compare employment opportunities that match career goals. ECD6.0
    6. Identify and exhibit traits for retaining employment. ECD7.0
    7. Identify opportunities and research requirements for career advancement. ECD8.0
    8. Research the benefits of ongoing professional development. ECD9.0
    9. Examine and describe entrepreneurship opportunities as a career planning option. ECD10.0
    10. Conduct a job search and analyze the requirements of the job.
    11. Determine the ramifications of a poor-driving record on employability opportunities.
    12. Assess the importance of confidentiality in the workplace.
15. Apply building codes and regulations to the preparation of CAD drawings and construction documents–-The student will be able to:
    1. Research local, state, and federal codes, regulations, and standards.
    2. Research local, state, and federal regulatory agencies.
    3. Research and apply appropriate zoning requirements for a project.
    4. Research and apply appropriate building codes for a project.
    5. Demonstrate the use of CAD software to prepare project drawings.
    6. Write specifications for a project.
    7. Prepare construction documents for a project.

## Course Number: BCV 0081

## Occupational Completion Point: B

## Carpentry and Masonry Technician – 150 Hours – SOC Code 49-9071

1. Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance--The students will be able to:
   1. Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments. SHE1.0
   2. Explain emergency procedures to follow in response to workplace accidents.
   3. Create a disaster and/or emergency response plan. SHE2.0
2. Demonstrate rough carpentry skills--The student will be able to:
   1. Determine boundary lines.
   2. Determine elevations.
   3. Determine need to add, remove, or relocate fill.
   4. Layout and mark building location and elevation.
   5. Clean and maintain the site.
   6. Construct various types of concrete forms.
   7. Determine the need for and utilize in-beds used in concrete formwork.
   8. Demonstrate appropriate form stripping and handling techniques.
   9. Calculate, layout and install framing members for a structure.
   10. Dry in a structure.
   11. Identify and assess the suitability of different types of roofing systems and their application to various construction projects.
   12. Install various roofing materials and sealers.
3. Demonstrate finish carpentry skills–-The student will be able to:
   1. Install insulation.
   2. Install interior finish materials.
   3. Install exterior and interior doors.
   4. Install windows.
   5. Install interior trim and hardware.
   6. Install acoustical ceiling systems.
   7. Install cabinets and trim.
4. Demonstrate masonry skills--The student will be able to:
   1. Mix various types of concrete, considering application and Pounds per Square Inch (PSI) strength.
   2. Identify and select masonry tools.
   3. Demonstrate the procedures of concrete installation for a project.
   4. Identify and select cleaning materials and equipment.
   5. Demonstrate safe and proper procedures for cleaning equipment, materials, work area, and worker.
   6. Utilize the tools and equipment used for mixing mortar.
   7. Analyze the factors that affect the consistency of mortar.
   8. Determine the common ratios (M, N, S, and O) of mortar mixtures.
   9. Layout and install concrete block for a project.
   10. Implement the methods of putting up the line.
   11. Utilize pointing tools to strike mortar joints.
   12. Identify and use the various types of trowels.
   13. Mix and apply stucco to a project.
5. Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment--The students will be able to:

* 1. Describe the nature and types of business organizations. SY1.0
  2. Explain the effect of key organizational systems on performance and quality.
  3. List and describe quality control systems and/or practices common to the workplace. SY2.0
  4. Explain the impact of the global economy on business organizations.

## Course Number: BCV 0082

## Occupational Completion Point: C

## Electrical and Plumbing Technician – 150 Hours – SOC Code 49-9071

1. Demonstrate electrical rough in skills--The student will be able to:
   1. Apply basic electrical theory to wiring a project.
   2. Design and install a branch circuit system in a project.
   3. Install Ground Fault Circuit Interrupter (GFCI) circuitry.
   4. Troubleshoot electrical systems, using testing and metering devices.
   5. Install a meter, distribution panel, and breaker panel for a project.
   6. Identify types of wiring raceways.
   7. Install conduit, pipe, shielded electrical cable, and electrical boxes in a project.
2. Demonstrate finish electrical skills--The student will be able to:
   1. Install electrical:
      1. Breakers
      2. Outlets
      3. Switches
      4. Light fixtures
   2. Wire an air conditioning system into an electrical supply.
   3. Test and inspect electrical systems.
3. Demonstrate plumbing rough in skills--The student will be able to:
   1. Select and install various pipes, tubing, fittings and connectors used in the plumbing trade for a specific project.
   2. Layout and install a water distribution system for a project.
   3. Layout and install a waste and vent system for a project.
   4. Test and inspect plumbing systems.
4. Demonstrate finish plumbing skills--The student will be able to:
   1. Install bathroom fixtures and hardware, such as:
      1. Lavatory
      2. Water closet
      3. Urinal
      4. Shower
      5. Bathtub
      6. Traps
   2. Install kitchen fixtures and hardware, such as:
      1. Sinks
      2. Garbage disposals
      3. Faucets
      4. Hot-water-heater tanks

## Course Number: BCV 0083

## Occupational Completion Point: D

## A/C and Painting Technician – 150 Hours – SOC Code 49-9071

1. Demonstrate personal money-management concepts, procedures, and strategies--The students will be able to:
   1. Identify and describe the services and legal responsibilities of financial institutions. FL2.0
   2. Describe the effect of money management on personal and career goals. FL3.0
   3. Develop a personal budget and financial goals. FL3.1
   4. Complete financial instruments for making deposits and withdrawals. FL3.2
   5. Maintain financial records. FL3.3
   6. Read and reconcile financial statements. FL3.4
   7. Research, compare and contrast investment opportunities.
2. Demonstrate air conditioning rough in skills–-The student will be able to:
   1. Explain heating and cooling principles and code requirements.
   2. Perform basic calculations for heating and cooling loads.
   3. Select and install the components of an air conditioning system for a project including:
      1. Duct work
      2. Coolant lines
      3. Compressor package
      4. Coil package
   4. Identify and select refrigerants according to their properties.
3. Demonstrate finish air conditioning skills--The student will be able to:
   1. Determine a refrigerant level.
   2. Install a control system for a project.
   3. Install registers for a project.
   4. Examine computer-monitoring systems associated with Heating, Ventilation, and Air-Conditioning (HVAC) control systems and air-quality management.
4. Demonstrate painting and decorating skills--The student will be able to:
   1. Erect an extension ladder and a scaffold.
   2. Prepare surfaces for application of finishes.
   3. Apply finishes to a project including:
      1. Paint
      2. Stain
      3. Wallpaper
   4. Use appropriate techniques and materials for clean up.
5. Demonstrate science knowledge and skills--The students will be able to: AF4.0
   1. Assess molecular action as a result of temperature extremes, chemical reaction, and moisture content as it relates to the choice of materials and construction techniques.
   2. Discuss the role of creativity in constructing scientific questions, methods and explanations. AF4.1
   3. Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings. AF4.3
   4. Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and demonstrate knowledge of the proper precautions required for handling such materials.
   5. Explain pressure measurement in terms of PSI and inches of mercury.
   6. Explore new technology as it applies to the construction industry in terms of materials, processes and the need for continuing education.
6. Demonstrate mathematics knowledge and skills--The students will be able to: AF3.0
   1. Demonstrate knowledge of arithmetic operations. AF3.2
   2. Solve job-related problems by adding, subtracting, multiplying, and dividing numbers, using fractions, decimals, and whole numbers.
   3. Change numbers to percents.
   4. Solve job-related problems, using a calculator.
   5. Read a ruler and a tape measure.
   6. Compute feet, inches, and yards.
   7. Change hours and minutes to decimals, fractions, and mixed numbers.
   8. Construct charts/tables/graphs using functions and data. AF3.5
   9. Determine ratios and proportions.
   10. Convert measurements from the English to the metric system and from the metric to the English system.
   11. Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
   12. Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
   13. Analyze and apply data and measurements to solve problems and interpret documents. AF3.4
   14. Calculate the following for a specific job:
       1. Work hours
       2. Cost of the workers
       3. Cost to be charged to the client
   15. Explain and compute federal, state, and local taxes.
   16. Calculate the time charged for labor on the job.
7. Demonstrate design technology, building trades and construction management skills--The student will be able to:
   1. Apply the skills learned throughout the program to the design, construction, management and presentation of a capstone project.

**2013 – 2014**

# Florida Department of Education

# Student Performance Standards

## Course Title: Building Trades and Construction Design Technology 1

## Course Number: 8722010

## Course Credit: 1

## Course Description:

The purpose of this course is to develop the competencies essential to the building construction industry. These competencies include skills and knowledge related to safety practices, understanding all aspects of the industry, the use of hand and power tools, employability skills, human relations and leadership skills and related construction theory.

1. Follow safety practices and disaster plans--The student will be able to:
   1. Comply with all applicable Occupational Safety and Health Administration (OSHA) rules and regulations.
   2. Examine Material Safety Data Sheets (MSDS) and follow the procedures as necessary.
   3. Analyze and discuss the “Right-to-Know” Law as recorded in (29 CFR-1910.1200)
   4. Identify and use safety equipment.
   5. Analyze and follow disaster plans.
2. Demonstrate an understanding of the built environment--The student will be able to:
   1. Assess the development of construction technology, its impact on the built environment and the impact of growth on the construction industry.
   2. Assess the benefits of the construction industry on health and safety, communication, transportation, and the economy.
   3. Examine the relationship between construction and the environment.
   4. Debate the role of trade unions in the construction industry.
   5. Examine the role of apprenticeship in the construction industry.
   6. Determine the different classifications of construction projects.
   7. Compare and contrast the roles and responsibilities of the general contractor, specialty contractor, construction management, and design build firms.
3. Demonstrate an understanding of the construction industry and related occupations--The student will be able to:
   1. Survey construction trade occupations and the roles and responsibilities of each craft.
   2. Survey construction management occupations and the roles and responsibilities of each.
   3. Survey design and engineering occupations and the roles and responsibilities of each.
   4. Assess the relationship between construction and the economy.
   5. Examine the process of applying for building permits and variances.
   6. Assess the need for, and impact of, zoning requirements on construction projects.
4. Identify and use basic hand tools--The student will be able to:
   1. Select and utilize appropriate hand tools typically used in the construction industry for specific tasks in accordance with safety guidelines.
5. Identify power tools and describe their proper operation--The student will be able to:
   1. Select and utilize appropriate power tools and equipment typically used in the construction industry for specific tasks in accordance with safety guidelines.
6. Solve problems using critical thinking skills, creativity and innovation--The students will be able to:
   1. Employ critical thinking skills independently and in teams to solve problems and make decisions. PS1.0
   2. Employ critical thinking and interpersonal skills to resolve conflicts. PS2.0
   3. Identify and document workplace performance goals and monitor progress toward those goals. PS3.0
   4. Conduct technical research to gather information necessary for decision-making. PS4.0
7. Describe the importance of professional ethics and legal responsibilities--The students will be able to:
   1. Evaluate and justify decisions based on ethical reasoning. ELR1.0
   2. Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies. ELR1.1
   3. Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace. ELR1.2
   4. Interpret and explain written organizational policies and procedures. ELR2.0
8. Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives--The students will be able to:
   1. Employ leadership skills to accomplish organizational goals and objectives. LT1.0
   2. Establish and maintain effective working relationships with others in order to accomplish objectives and tasks. LT3.0
   3. Conduct and participate in meetings to accomplish work tasks. LT4.0
   4. Employ mentoring skills to inspire and teach others. LT5.0

**2013 – 2014**

# Florida Department of Education

# Student Performance Standards

## Course Title: Building Trades and Construction Design Technology 2

## Course Number: 8722020

## Course Credit: 1

## Course Description:

The purpose of this course is to develop the competencies necessary for the building, construction and repair industry. These competencies relate to communication and computer skills; construction components, materials and hardware; and blueprints, specifications, and construction documents.

1. Use oral and written communication skills in creating, expressing and interpreting information and ideas--The students will be able to:
   1. Select and employ appropriate communication concepts and strategies to enhance oral and written communication in the workplace. CM1.0
   2. Locate, organize and reference written information from various sources. CM3.0
   3. Design, develop and deliver formal and informal presentations using appropriate media to engage and inform diverse audiences. CM5.0
   4. Interpret verbal and nonverbal cues/behaviors that enhance communication. CM6.0
   5. Apply active listening skills to obtain and clarify information. CM7.0
   6. Develop and interpret tables and charts to support written and oral communications. CM8.0
   7. Exhibit public relations skills that aid in achieving customer satisfaction.CM10.0
2. Use information technology tools--The students will be able to:
   1. Use Personal Information Management (PIM) applications to increase workplace efficiency. IT1.0
   2. Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications. IT2.0
   3. Employ computer operations applications to access, create, manage, integrate, and store information. IT3.0
   4. Employ collaborative/groupware applications to facilitate group work. IT4.0
3. Research construction components, materials, hardware, and characteristics--The student will be able to:
   1. Research the various components, materials and hardware used in residential construction applications.
   2. Research the various components, materials and hardware used in commercial construction applications.
   3. Research the various components, materials and hardware used in industrial construction applications.
   4. Compare and contrast the components, materials and hardware used in residential, commercial and industrial construction applications.
4. Demonstrate language arts knowledge and skills--The students will be able to: AF2.0
   1. Locate, comprehend and evaluate key elements of oral and written information. AF2.4
   2. Draft, revise, and edit written documents using correct grammar, punctuation and vocabulary. AF2.5
   3. Present information formally and informally for specific purposes and audiences. AF2.9
5. Read contract blueprints, documents and specifications--The student will be able to:
   1. Determine the purpose and components of contract documents and specifications.
   2. Analyze the importance of building codes, and zoning regulations on the development of blueprints and specifications.
   3. Incorporate the following elements in the development of blueprints and specifications:
      1. Dimensions
      2. Construction views
      3. Section views
      4. Site plans
      5. Foundation plans
      6. Floor plans and elevations
      7. Details and schedules
      8. Wiring details
      9. Plumbing details
      10. Mechanical details
   4. Utilize building symbols in the development of blueprints.
   5. Prepare lists of materials and specifications.
   6. Use architectural and engineering scales.
   7. Demonstrate the basic use of computer-aided design software.

**2013 – 2014**

# Florida Department of Education

# Student Performance Standards

## Course Title: Building Trades and Construction Design Technology 3

## Course Number: 8722030

## Course Credit: 1

## Course Description:

The purpose of this course is to develop the competencies necessary for the building, construction and repair industry. These competencies relate to entrepreneurship, building codes and regulations, and CAD drawings and construction documents.

1. Explain the importance of employability and entrepreneurship skills--The students will be able to:
   1. Identify and demonstrate positive work behaviors needed to be employable. ECD1.0
   2. Develop personal career plan that includes goals, objectives, and strategies. ECD2.0
   3. Examine licensing, certification, and industry credentialing requirements. ECD3.0
   4. Maintain a career portfolio to document knowledge, skills, and experience. ECD5.0
   5. Evaluate and compare employment opportunities that match career goals. ECD6.0
   6. Identify and exhibit traits for retaining employment. ECD7.0
   7. Identify opportunities and research requirements for career advancement. ECD8.0
   8. Research the benefits of ongoing professional development. ECD9.0
   9. Examine and describe entrepreneurship opportunities as a career planning option. ECD10.0
   10. Conduct a job search and analyze the requirements of the job.
   11. Determine the ramifications of a poor-driving record on employability opportunities.
   12. Assess the importance of confidentiality in the workplace.
2. Apply building codes and regulations to the preparation of CAD drawings and construction documents–-The student will be able to:
   1. Research local, state, and federal codes, regulations, and standards.
   2. Research local, state, and federal regulatory agencies.
   3. Research and apply appropriate zoning requirements for a project.
   4. Research and apply appropriate building codes for a project.
   5. Demonstrate the use of CAD software to prepare project drawings.
   6. Write specifications for a project.
   7. Prepare construction documents for a project.

**2013 – 2014**

# Florida Department of Education

# Student Performance Standards

## Course Title: Building Trades and Construction Design Technology 4

## Course Number: 8722040

## Course Credit: 1

## Course Description:

The purpose of this course is to provide students with hands on skills in the carpentry and masonry trades.

1. Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance--The students will be able to:
   1. Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments. SHE1.0
   2. Explain emergency procedures to follow in response to workplace accidents.
   3. Create a disaster and/or emergency response plan. SHE2.0
2. Demonstrate rough carpentry skills--The student will be able to:
   1. Determine boundary lines.
   2. Determine elevations.
   3. Determine need to add, remove, or relocate fill.
   4. Layout and mark building location and elevation.
   5. Clean and maintain the site.
   6. Construct various types of concrete forms.
   7. Determine the need for and utilize in-beds used in concrete formwork.
   8. Demonstrate appropriate form stripping and handling techniques.
   9. Calculate, layout and install framing members for a structure.
   10. Dry in a structure.
   11. Identify and assess the suitability of different types of roofing systems and their application to various construction projects.
   12. Install various roofing materials and sealers.
3. Demonstrate finish carpentry skills–-The student will be able to:
   1. Install insulation.
   2. Install interior finish materials.
   3. Install exterior and interior doors.
   4. Install windows.
   5. Install interior trim and hardware.
   6. Install acoustical ceiling systems.
   7. Install cabinets and trim.
4. Demonstrate masonry skills--The student will be able to:
   1. Mix various types of concrete, considering application and Pounds per Square Inch (PSI) strength.
   2. Identify and select masonry tools.
   3. Demonstrate the procedures of concrete installation for a project.
   4. Identify and select cleaning materials and equipment.
   5. Demonstrate safe and proper procedures for cleaning equipment, materials, work area, and worker.
   6. Utilize the tools and equipment used for mixing mortar.
   7. Analyze the factors that affect the consistency of mortar.
   8. Determine the common ratios (M, N, S, and O) of mortar mixtures.
   9. Layout and install concrete block for a project.
   10. Implement the methods of putting up the line.
   11. Utilize pointing tools to strike mortar joints.
   12. Identify and use the various types of trowels.
   13. Mix and apply stucco to a project.
5. Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment--The students will be able to:
   1. Describe the nature and types of business organizations. SY1.0
   2. Explain the effect of key organizational systems on performance and quality.
   3. List and describe quality control systems and/or practices common to the workplace. SY2.0
   4. Explain the impact of the global economy on business organizations.

**2013 – 2014**

# Florida Department of Education

# Student Performance Standards

## Course Title: Building Trades and Construction Design Technology 5

## Course Number: 8722050

## Course Credit: 1

## Course Description:

The purpose of this course is to provide students with hands on skills in the electrical and plumbing trades.

1. Demonstrate electrical rough in skills--The student will be able to:
   1. Apply basic electrical theory to wiring a project.
   2. Design and install a branch circuit system in a project.
   3. Install Ground Fault Circuit Interrupter (GFCI) circuitry.
   4. Troubleshoot electrical systems, using testing and metering devices.
   5. Install a meter, distribution panel, and breaker panel for a project.
   6. Identify types of wiring raceways.
   7. Install conduit, pipe, shielded electrical cable, and electrical boxes in a project.
2. Demonstrate finish electrical skills--The student will be able to:
   1. Install electrical:
      1. Breakers
      2. Outlets
      3. Switches
      4. Light fixtures
   2. Wire an air conditioning system into an electrical supply.
   3. Test and inspect electrical systems.
3. Demonstrate plumbing rough in skills--The student will be able to:
   1. Select and install various pipes, tubing, fittings and connectors used in the plumbing trade for a specific project.
   2. Layout and install a water distribution system for a project.
   3. Layout and install a waste and vent system for a project.
   4. Test and inspect plumbing systems.
4. Demonstrate finish plumbing skills--The student will be able to:
   1. Install bathroom fixtures and hardware, such as:
      1. Lavatory
      2. Water closet
      3. Urinal
      4. Shower
      5. Bathtub
      6. Traps
   2. Install kitchen fixtures and hardware, such as
      1. Sinks
      2. Garbage disposals
      3. Faucets
      4. Hot-water-heater tanks

**2013 – 2014**

# Florida Department of Education

# Student Performance Standards

## Course Title: Building Trades and Construction Design Technology 6

## Course Number: 8722060

## Course Credit: 1

## Course Description:

This course is designed to provide students with hands on skills in the air conditioning and painting and decorating trades, and to further develop all of the skills acquired throughout the program.

1. Demonstrate personal money-management concepts, procedures, and strategies--The students will be able to:
   1. Identify and describe the services and legal responsibilities of financial institutions. FL2.0
   2. Describe the effect of money management on personal and career goals. FL3.0
   3. Develop a personal budget and financial goals. FL3.1
   4. Complete financial instruments for making deposits and withdrawals. FL3.2
   5. Maintain financial records. FL3.3
   6. Read and reconcile financial statements. FL3.4
   7. Research, compare and contrast investment opportunities.
2. Demonstrate air conditioning rough in skills–-The student will be able to:
   1. Explain heating and cooling principles and code requirements.
   2. Perform basic calculations for heating and cooling loads.
   3. Select and install the components of an air conditioning system for a project including:
      1. Duct work
      2. Coolant lines
      3. Compressor package
      4. Coil package
   4. Identify and select refrigerants according to their properties.
3. Demonstrate finish air conditioning skills--The student will be able to:
   1. Determine a refrigerant level.
   2. Install a control system for a project.
   3. Install registers for a project.
   4. Examine computer-monitoring systems associated with Heating, Ventilation, And Air-Conditioning (HVAC) control systems and air-quality management.
4. Demonstrate painting and decorating skills--The student will be able to:
   1. Erect an extension ladder and a scaffold.
   2. Prepare surfaces for application of finishes.
   3. Apply finishes to a project including:
      1. Paint
      2. Stain
      3. Wallpaper
   4. Use appropriate techniques and materials for clean-up.
5. Demonstrate science knowledge and skills--The students will be able to: AF4.0
   1. Assess molecular action as a result of temperature extremes, chemical reaction, and moisture content as it relates to the choice of materials and construction techniques.
   2. Discuss the role of creativity in constructing scientific questions, methods and explanations. AF4.1
   3. Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings. AF4.3
   4. Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and demonstrate knowledge of the proper precautions required for handling such materials.
   5. Explain pressure measurement in terms of PSI and inches of mercury.
   6. Explore new technology as it applies to the construction industry in terms of materials, processes and the need for continuing education.
6. Demonstrate mathematics knowledge and skills--The students will be able to: AF3.0
   1. Demonstrate knowledge of arithmetic operations. AF3.2
   2. Solve job-related problems by adding, subtracting, multiplying, and dividing numbers, using fractions, decimals, and whole numbers.
   3. Change numbers to percents.
   4. Solve job-related problems, using a calculator.
   5. Read a ruler and a tape measure.
   6. Compute feet, inches, and yards.
   7. Change hours and minutes to decimals, fractions, and mixed numbers.
   8. Construct charts/tables/graphs using functions and data. AF3.5
   9. Determine ratios and proportions.
   10. Convert measurements from the English to the metric system and from the metric to the English system.
   11. Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
   12. Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
   13. Analyze and apply data and measurements to solve problems and interpret documents. AF 3.4
   14. Calculate the following for a specific job:
       1. Work hours
       2. Cost of the workers
       3. Cost to be charged to the client
   15. Explain and compute federal, state, and local taxes.
   16. Calculate the time charged for labor on the job.
7. Demonstrate design technology, building trades and construction management skills--The student will be able to:
   1. Apply the skills learned throughout the program to the design, construction, management and presentation of a capstone project.