Florida Department of Education
Curriculum Framework

Program Title: **Architectural Design and Construction Technology**
Career Cluster: **Architecture and Construction**

~~AS~~	
CIP Number	1604090100
Program Type	College Credit
Standard Length	66 Credit Hours
CTSO	SkillsUSA
SOC Codes (all applicable)	17-3011 – Architectural and Civil Drafters
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this program is to prepare students for employment as CAD draftspersons, residential and small commercial designers, plan examiners, and to help prepare students to become residential and building contractors. The program also helps to prepare students to further their education in architecture and/or construction.

The program offers courses that teach technical knowledge and skills in drafting, design, and construction needed to design and build the next generation of crafted, code compliant, healthy, comfortable, resource efficient, durable houses and buildings based on sustainable design strategies, applied building science principles, and mainstream green building practices.

The content includes but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, assisting architects and architectural engineers in planning and designing structures, using construction materials, and dealing with contracts and specifications.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of 66 credit hours.

Standards

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

01.0 Demonstrate appropriate communicate skills.
02.0 Identify, select, apply and maintain drafting, drawing and graphic materials and equipment, including both table top drafting and Computer Aided Drafting (CAD).
03.0 Identify and specify appropriate construction materials and their applications.
04.0 Interpret construction drawings and documents.
05.0 Understand and apply fundamental principles of architectural and engineering design.
06.0 Interpret and apply building code regulations and product technical literature.
07.0 Produce architectural working drawings using both table top drafting and CAD.
08.0 Produce structural drawings using both table top drafting and CAD for steel and concrete structures.
09.0 Prepare subcontractor shop drawings using both table top drafting and CAD.
10.0 Survey and assess construction sites.
11.0 Estimate basic quantities of materials.
12.0 Perform office and organizational procedures.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate an appropriate understanding of building science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.
17.0 Understand sustainability issues related to the design, construction and maintenance of the built environment.
18.0 Select and apply sustainable design strategies, building science principles, and green building construction best practices. (Optional)

Florida Department of Education
Student Performance Standards

Program Title: **Architectural Design and Construction Technology**
CIP Number: **1604090100**
Program Length: **66 Credit Hours**
SOC Code(s): **17-3011**

Refer to Rule 6A-14.030 (4) F.A.C., for the minimum amount of general education coursework required in the Associate of Science (AS) degree. At the completion of this program, the student will be able to:	
01.0	Demonstrate appropriate communicate skills--The student will be able to:
01.01	Identify communication channels in organizations.
01.02	Develop and use effective means of communications.
01.03	Develop an effective working relationships with others.
01.04	Prepare accurate business correspondence, memos, forms/invoices, reports, etc.
01.05	Use various electronic communication technologies and social media appropriately.
01.06	Compose clear and concise oral and written technical reports and presentations.
01.07	Participate in technical discussions and meetings.
01.08	Read and understand graphs, charts, diagrams and tables commonly used in this industry/occupation area.
01.09	Read and follow written and oral instructions.
01.10	Answer and ask questions coherently and concisely.
01.11	Read critically by recognizing assumptions and implications and by evaluating ideas.
02.0	Identify, select, apply and maintain drafting, drawing and graphic materials and equipment, including both table top drafting and Computer Aided Drafting (CAD)--The student will be able to:
02.01	Use architectural and engineering scales.
02.02	Identify and select appropriate drawing materials.
02.03	Select, apply and maintain basic drawing instruments including both table top drafting tools and computer hardware devices and software programs.
02.04	Identify, apply and maintain lettering instruments.

	02.05	Identify and select leads, lead holders, sharpeners and erasers for table top drafting.
	02.06	Identify, select, operate and maintain reproduction materials and equipment including plotters, laser printers, inkjet printers, blueprint machines, etc.
	02.07	Select and apply architectural and engineering curves and templates.
	02.08	Set up and maintain drafting table, T-square and parallel rule.
	02.09	Operate and maintain inking equipment and drafting materials.
	02.10	Identify, select and apply color markers and pencils.
	02.11	Identify, select and apply water base colors.
	02.12	Select and apply scribing materials and instruments.
	02.13	Operate calculators and use spreadsheets.
	02.14	Identify and use the metric system.
	02.15	Identify, maintain and operate photography equipment.
	02.16	Apply and develop drawing techniques using both table top drafting and CAD.
	02.17	Apply and develop freehand drawing and lettering techniques.
03.0	Identify and specify appropriate construction materials and their applications--The student will be able to:	
	03.01	Identify and specify paving materials and applications.
	03.02	Identify and specify formwork materials and methods.
	03.03	Identify and specify concrete materials and applications.
	03.04	Identify and specify reinforcing steel and applications.
	03.05	Identify and specify masonry materials and applications.
	03.06	Identify and specify structural steel shapes, materials and applications.
	03.07	Identify and specify miscellaneous metal components and applications.
	03.08	Identify and specify wood construction materials and applications.
	03.09	Identify and specify millwork, finished carpentry, trim details, cabinets and other finish carpentry applications.

03.10	Identify and specify adhesives and sealants and applications.
03.11	Identify and specify plastic laminates and applications.
03.12	Identify and specify waterproofing materials and vapor barriers and applications.
03.13	Identify and specify insulation materials and their applications to create thermal boundaries.
03.14	Identify and specify roofing materials and applications.
03.15	Identify and specify flashings and applications.
03.16	Identify and specify glazing materials for windows, doors and other openings.
03.17	Identify and specify exterior cladding finishes and applications.
03.18	Identify and specify floor finish materials and applications.
03.19	Identify and specify wall finish materials and applications.
03.20	Identify and specify ceiling finish materials and applications.
03.21	Identify and specify fire proofing materials and applications.
03.22	Identify and specify interior and exterior finish hardware and applications.
03.23	Identify and specify manufactured specialty products and applications.
03.24	Identify and specify applications of pre-engineered and prefabricated structures.
03.25	Identify and specify common plumbing components.
03.26	Identify and specify Heating, Ventilation and Air-Conditioning (HVAC) equipment and components.
03.27	Identify and specify common electrical components.
04.0	Interpret construction drawings and documents--The student will be able to:
04.01	Interpret technical symbols.
04.02	Interpret topographical drawings.
04.03	Interpret aerial photographs and maps.
04.04	Interpret site drawings.

04.05	Interpret architectural drawings.
04.06	Interpret written specifications.
04.07	Interpret addendums.
04.08	Interpret notice of change and change orders.
04.09	Interpret shop drawings.
04.10	Interpret structural drawings.
04.11	Interpret mechanical drawings.
04.12	Interpret electrical drawings.
04.13	Interpret modular design strategies and constructability of buildings.
04.14	Identify and interpret design and construction contracts and agreements.
04.15	Identify and interpret lien waivers.
04.16	Interpret property deeds.
04.17	Interpret development plans and documents.
05.0	Understand and apply fundamental principles of architectural and engineering design--The student will be able to:
05.01	Understand a concrete slump test.
05.02	Understand concrete cylinder compression tests.
05.03	Understand soil analysis reports.
05.04	Understand compaction tests and reports.
05.05	Understand live and dead load designs.
05.06	Determine effect of loads on materials.
05.07	Understand expansion and contraction principles of various building materials and control strategies.
05.08	Understand the fundamentals of building site requirements.
05.09	Determine and apply space relationships.

06.0	Interpret and apply building code regulations and product technical literature--The student will be able to:
06.01	Use appropriate time-saving reference materials.
06.02	Interpret and apply state and national building codes, in-particular the International Building Codes (IBC), and Florida Building codes.
06.03	Interpret and apply local municipal codes and regulations.
06.04	Interpret zoning bylaws and regulations.
06.05	Interpret zoning maps.
06.06	Read building and architectural trade magazines and catalogs.
06.07	Apply regional building estimating costs.
06.08	Be aware of local, regional and state building and architectural association’s current legislative regulations.
07.0	Produce architectural working drawings using both table top drafting and CAD--The student will be able to:
07.01	Prepare floor plan drawings.
07.02	Prepare foundation plan and detail drawings.
07.03	Prepare elevation drawings.
07.04	Prepare landscape layouts.
07.05	Prepare material and product schedules.
07.06	Prepare section drawings.
07.07	Build architectural models.
07.08	Prepare truss drawings.
07.09	Prepare stairway drawings.
07.10	Prepare fireplace drawings.
07.11	Prepare plot and site plan drawings.
08.0	Produce structural drawings using both table top drafting and CAD for steel and concrete structures--The student will be able to:
08.01	Draw beam connections.

	08.02 Draw structural assemblies.
	08.03 Prepare structural drawings.
	08.04 Make material quantity take-offs from reinforced concrete engineering drawings.
	08.05 Prepare footing and foundation drawings.
	08.06 Prepare column detail drawings.
	08.07 Prepare floor and roof detail drawings.
	08.08 Prepare special structure detail drawings.
	08.09 Prepare framed beam connection drawings.
	08.10 Prepare bolted column detail drawings.
09.0	Prepare subcontractor shop drawings using both table top drafting and CAD--The student will be able to:
	09.01 Prepare plumbing fixture and appliance layout plan drawings.
	09.02 Prepare thermal building enclosure construction drawings that include insulation and air barrier details.
	09.03 Prepare electrical plan drawings.
10.0	Survey and assess construction sites--The student will be able to:
	10.01 Prepare site assessment sketches and document with photographs.
	10.02 Layout a building foundation on a building site.
	10.03 Use levels and field rods when surveying property.
	10.04 Use a transit, builder’s level and laser level to layout a building foundation.
	10.05 Interpret angular and distance measurements to bearings and azimuth. (Optional)
	10.06 Use the Pythagorean theorem when laying out a building.
	10.07 Assess a piece of property to determine the type of foundation best suited for the building site.
11.0	Estimate basic quantities of materials--The student will be able to:
	11.01 Compute area and volume of buildings.

	11.02 Estimate quantities of excavation and fill.
	11.03 Take off quantities of form work.
	11.04 Take off quantities of concrete.
	11.05 Take off quantities of lumber.
	11.06 Take off quantities of masonry.
	11.07 Interpret and complete standard estimator's form.
	11.08 Apply the use of computer estimating software.
	11.09 Understand and create construction budgets.
12.0	Perform office and organizational procedures--The student will be able to:
	12.01 Organize and maintain personal work area.
	12.02 Operate office equipment.
	12.03 Estimate, order and maintain office and drafting supplies.
	12.04 Maintain drawing file systems.
	12.05 Maintain record of building costs.
	12.06 Develop and maintain technical reference library.
	12.07 Understand the variety of construction and project management systems.
	12.08 Use project management and scheduling software.
13.0	Demonstrate appropriate math skills--The student will be able to:
	13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares and cylinders.
	13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
	13.03 Add, subtract, multiply and divide using fractions, decimals and whole numbers.
	13.04 Determine the correct purchase price, to include sales tax for a quantity of materials.
	13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0	Demonstrate an appropriate understanding of building science--The student will be able to:
14.01	Understand heat, air and moisture flows related to building enclosures, and their performance, as a system.
14.02	Understand benefits and consequences of properly designed and constructed building enclosure thermal boundaries.
14.03	Identify health related problems which may result from exposure to work related chemicals and hazardous materials and know the proper precautions required for handling such materials.
14.04	Understand various pressure measurements used in testing buildings and their components for performance, such as Pounds per Square Inch (PSI), Cubic Feet per Minute (CFM) and Kilopascal (KPA).
15.0	Demonstrate employability skills--The student will be able to:
15.01	Conduct a job search.
15.02	Secure information about a job.
15.03	Identify documents which may be required when applying for a job interview and create a portfolio.
15.04	Write a resume, cover letter and fill out a typical job application form.
15.05	Demonstrate competence in job interview techniques.
15.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
15.07	Exhibit acceptable work habits.
15.08	Demonstrate knowledge of how to make job changes appropriately.
15.09	Demonstrate acceptable employee health habits.
16.0	Demonstrate an understanding of entrepreneurship--The student will be able to:
16.01	Describe entrepreneurship.
16.02	Describe the importance of entrepreneurship and small business ownership to the American economy.
16.03	List the advantages and disadvantages of business ownership.
16.04	Identify the risks involved in ownership of a business.
16.05	Identify the necessary personal characteristics of a successful entrepreneur.
16.06	Identify the business skills needed to operate a small business efficiently and effectively.
17.0	Understand sustainability issues related to the design, construction and maintenance of the built environment--The student will be able to:

	17.01	Describe the impact of the construction industry on the natural environment.
	17.02	Describe the life cycle phases of a building and its impacts on the environment throughout the life of the building.
	17.03	Identify and analyze sustainable alternatives to conventional construction practices.
	17.04	Identify specific design and construction principles, practices and strategies that lessen adverse impacts on the natural environment.
	17.05	Know various building design and construction energy analysis tools and software that help to determine the buildings performance before it is constructed.
	17.06	Identify design features, appropriate construction details and maintenance practices that contribute to a project's overall sustainability.
18.0	Select and apply sustainable design strategies, building science principles, and green building construction best practices (Optional)--The student will be able to:	
	18.01	Define sustainability as it relates to designing durable, resilient buildings.
	18.02	Select and apply sustainable design strategies to design and/or construct buildings.
	18.03	Define building science.
	18.04	Select and apply current building science principles to design and/or construct buildings.
	18.05	Define green building.
	18.06	Select and apply green building construction practices when designing and/or constructing a building.
	18.07	Select and apply third party (green, energy, water, and IAQ) certification guidelines or requirements when designing and/or constructing a building.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

SkillsUSA is the intercurricular 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.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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 counselor and/or instructors. 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.

Certificate Programs

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.). This AAS degree program includes the following College Credit Certificates:

Sustainable Design (0630330106) – 19 Credit Hours

Standards for the above certificate programs are contained in separate curriculum frameworks.

Additional Resources

For additional information regarding articulation agreements, Bright Futures Scholarships, Fine Arts/Practical Arts Credit and Equivalent Mathematics and Equally Rigorous Science Courses please refer to:
http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml