

Florida Department of Education  
CURRICULUM FRAMEWORK

**Program Title:** CIVIL ENGINEERING AIDE  
**Program Type:** Job Preparatory  
**Occupational Area:** Public Service Occupations  
**Components:** One Program with One Occupational Completion Point

**Secondary**

**Program Numbers** 8915000  
**CIP Number** 0715.029901  
**Grade Level** 9-12, 30, 31  
**Length** 4 credits  
**Certification** TEC CONSTR @7 G  
 TEC EN AID @7 G  
 SURVEYING @7 G  
**CSO** FPSA, Inc.  
**Facility Code** 263  
**Co-op Method** Yes  
**Apprenticeship** Yes

- I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for entry level employment as surveying technicians (SOC 17-3031.01), mapping technicians (SOC 17-3031.02), and surveyor's helpers assisting civil engineers, surveyors, urban planners or civil engineering aides (SOC 17-2051).

The content includes, but is not limited to, basic mathematical, scientific, or technical aspects of civil engineering or urban planning; beginning surveying, including mapping natural terrain; drafting; employability skills; health and safety including first aid and CPR; and communication skills.

Reinforcement of basic skills in English, mathematics, and science appropriate for the job preparatory programs is provided through career and technical classroom instruction and applied laboratory procedures or practice. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the public service industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues.

Listed below are the courses that comprise this program when offered at the secondary level:

- 8915010 - Civil Engineering Aide 1
- 8915020 - Civil Engineering Aide 2
- 8915030 - Civil Engineering Aide 3
- 8915040 - Civil Engineering Aide 4

- II. **LABORATORY ACTIVITIES:** Laboratory activities including basic civil drafting and blue print reading are an appropriate part of this program. Laboratory and field activities relating to surveying are required.

**III. SPECIAL NOTES:** The Florida Public Service Association (FPSA), Inc. is the appropriate Career Student Organization (CSO) for providing leadership training and for reinforcing specific career and technical skills. CSOs, when provided, shall be an integral part of the career and technical instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, Florida Administrative Code (F.A.C.).

Cooperative training - OJT is appropriate for this program. Whenever the cooperative training is offered, the following are required for each student: (1) a training plan that is signed by the student, teacher, and employer and that includes instructional objectives and a list of on-the-job and in-school learning experiences and (2) a work station that reflects equipment, skills, and tasks relevant to the occupation that the student has chosen as a career goal. The student must be paid for work performed.

When a secondary student with a disability is enrolled in a career and technical class with modifications to the curriculum framework, the particular outcomes and student performance standards that the student must master to earn credit must be specified on an individual basis. The job or jobs for which the student is being trained should be reflected in the student's desired postschool outcome statement on the Transitional Individual Educational Plan (Transition IEP).

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Adult students with disabilities must self-identify and request such services. 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.

Scans Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

**IV. INTENDED OUTCOMES:** After successfully completing this program, the student will be able to:

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

Surveying Technician -SOC 17-3031.01  
Mapping Technician - SOC 17-3031.02  
Civil Engineering Aide - SOC 17-2051

**CIVIL ENGINEERING AIDE 1 - 8915010**

- 01.0 Demonstrate algebraic and geometric math skills using concrete and graphic models.
- 02.0 Demonstrate applicable communication skills.
- 03.0 Practice work place safety.

- 04.0 Assist civil engineers in collecting and analyzing soil samples.
- 05.0 Demonstrate the use of survey and mapping instruments to perform level surveys.

**CIVIL ENGINEERING AIDE 2 - 8915020**

- 06.0 Identify uses of photographic equipment.
- 07.0 Demonstrate beginning knowledge of grading and drainage concepts.
- 08.0 Demonstrate the use of survey instruments to conduct boundary surveys.
- 09.0 Understand the concept of balance of structure.
- 10.0 Demonstrate model building, using civil engineering principles.
- 11.0 Demonstrate basic computer skills.

**CIVIL ENGINEERING AIDE 3 - 8915030**

- 12.0 Assist transportation planners in developing specifications and materials for traffic engineering.
- 13.0 Prepare project drawings and supporting documents.
- 14.0 Demonstrate an understanding of the business of civil engineering.

**CIVIL ENGINEERING AIDE 4 - 8915040**

- 15.0 Demonstrate employability skills.
- 16.0 Identify the purposes and uses of civil engineering documents and/or forms.
- 17.0 Demonstrate the practical application of civil engineering skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8915010  
**Course Title:** Civil Engineering Aide 1  
**Course Credit:** 1

**COURSE DESCRIPTION:** This course provides basic mathematical, scientific, or technical aspects of civil engineering. Work place safety and communication skills are included.

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

Surveying Technician - SOC 17-3031.01  
Mapping Technician - SOC 17-3031.02  
Civil Engineering Aide - SOC 17-2051

01.0 DEMONSTRATE ALGEBRAIC AND GEOMETRIC MATH SKILLS USING CONCRETE AND GRAPHIC MODELS--The student will be able to:

- 01.01 Calculate missing elements of right triangles using the Pythagorean Theorem and trigonometric functions. MA.A.3.4, MA.B.1.4, MA.C.3.4, SS.A.2.4, SS.B.1.4
- 01.02 Calculate volume and area of rectangles, squares, triangles, parallelograms, cylinders, cones, and spheres. MA.B.1.4, SS.A.2.4, SS.B.1.4
- 01.03 Collect, read, analyze, interpret, and report on data in graphs, charts, spreadsheets, and tables. MA.E.1.4, LA.A.1.4, LA.A.2.4, LA.B.1.4, AT 5.1.4
- 01.04 Measure dimensions of time, temperature, distance, capacity and mass/weight using real life models and computer simulations. MA.B.1.4, MA.B.3.4, SC.H.3.4, LA.A.1.4, LA.B.2.4, SS.B.1.4, SS.B.2.4, AT.5.1.4
- 01.05 Make and apply measurements to include, but not limited to, distance, perimeter, area, volume, force, shear and pressure (load) in both traditional and metric units. MA.B.2.4, LA.A.1.4, LA.A.2.4, SS.A.3.4, SS.B.1.4, AT.5.1.4
- 01.06 Make estimates and approximations and judge the feasibility of the result. MA.B.3.4, SS.A.2.4, SS.A.3.4, LA.A.1.4, LA.A.2.4, LA.C.3.4, HE.B.2.4, AT.5.1.4

02.0 DEMONSTRATE APPLICABLE COMMUNICATION SKILLS--The student will be able to:

- 02.01 Define civil engineering terms by use of structural analysis, decoding, contextual clues or by using a dictionary. LA.A.1.4, LA.B.1.4, LA.B.2.4, LA.C.3.4, LA.D.2.4, AT.5.1.4
- 02.02 Distinguish between factual statements and professional opinion in written reports. LA.A.2.4, LA.C.1.4, LA.C.3.4, LA.D.2.4, LA.E.2.4, SC.H.1.4, SS.A.1.4, AT.5.1.4, AT.5.2.4
- 02.03 Demonstrate ability to report observations in written or oral form. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.3.4, SS.A.3.4, AT.5.1.4, AT.5.2.4

03.0 PRACTICE WORK PLACE SAFETY--The student will be able to:

- 03.01 Identify hazards related to civil engineering and prevention of injury. HE.A.1.4, HE.B.1.4, HE.C.2.4, AT.A.1.4, LA.A.1.4, LA.A.2.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4, HE.A.2.4, SS.B.2.4
  - 03.02 Describe and practice safety techniques related to confined entry conditions, handling chemicals and materials, spill controls, etc. HE.B.1.4, HE.B.2.4, HE.B.3.4, SC.H.3.4, LA.C.1.4, LA.C.2.4, LA.C.3.4, SS.A.3.4, SS.A.5.4
  - 03.03 Select and wear protective apparel. HE.A.1.4, HE.B.1.4, SC.H.3.4, LA.A.1.4, LA.A.2.4
- 04.0 ASSIST CIVIL ENGINEERS IN COLLECTING AND ANALYZING SOIL SAMPLES--The student will be able to:
- 04.01 Understand why soil samples are collected and tested. SC.H.2.4, LA.A.1.4, LA.A.2.4, SS.A.3.4, AT.5.1.4
  - 04.02 Demonstrate the procedures used to prepare soil samples for testing. SC.H.3.4, SS.A.3.4, MA.B.4.4, LA.B.2.4, AT.5.1.4
  - 04.03 Show ability to take a disturbed soil sample. MA.B.4.4, MA.E.1.4, LA.A.2.4, LA.B.2.4, LA.C.1.4, LA.C.3.4, AT.5.1.4
- 05.0 DEMONSTRATE THE USE OF SURVEY AND MAPPING INSTRUMENTS TO PERFORM LEVEL SURVEYS--The student will be able to:
- 05.01 Demonstrate knowledge and use of survey equipment. LA.A.1.4, LA.A.2.4, LA.C.1.4, LA.C.3.4, SS.B.1.4, AT.5.1.4
  - 05.02 Perform a level survey. MA.B.4.4, SS.B.1.4, LA.C.3.4, AT.5.1.4
  - 05.03 Read and analyze a topographic contour map. MA.B.4.4, MA.E.1.4, LA.A.1.4, LA.A.2.4, LA.D.2.4, SC.H.3.4, AT.5.2.4
  - 05.04 Generate topographic contours from field notes. MA.E.1.4, SS.B.1.4, SC.H.3.4, AT.5.2.4

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8915020  
**Course Title:** Civil Engineering Aide 2  
**Course Credit:** 1

**COURSE DESCRIPTION:** This course provides instruction in beginning photography, drainage and geological concepts. Students will be introduced to the use of the computer in civil engineering. Practical application of concepts will be demonstrated through model building.

- 06.0 IDENTIFY USES OF PHOTOGRAPHIC EQUIPMENT--The student will be able to:
- 06.01 Understand documentation and record-keeping purposes and procedures. SS.B.2.4, SC.G.2.4, LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, AT.5.1.4
  - 06.02 Understand legal, environmental and public relations applications of visual records. SS.C.2.4, LA.A.2.4, AT.5.1.4
  - 06.03 Demonstrate proper use of photographic equipment. AT.5.1.4
- 07.0 DEMONSTRATE BEGINNING KNOWLEDGE OF GRADING AND DRAINAGE CONCEPTS--The student will be able to:
- 07.01 Identify water and wastewater management systems' impact on engineering projects and planning. SC.H.3.4, SS.B.2.4, LA.A.1.4, LA.A.2.4, HE.A.1.4, HE.C.1.4, HE.C.2.4, AT.5.1.4
  - 07.02 Demonstrate knowledge of hydrolic flow through use of correct mathematical formulas and report analysis. MA.B.4.4, MA.D.2.4, LA.B.1.4, LA.B.2.4, AT.5.1.4
  - 07.03 Recognize soil types as related to overland flow. LA.A.1.4, SC.G.2.4, AT.5.1.4
- 08.0 DEMONSTRATE THE USE OF SURVEY INSTRUMENTS TO CONDUCT BOUNDARY SURVEYS--The student will be able to:
- 08.01 Perform boundary survey. MA.B.2.4, MA.B.4.4, MA.C.3.4, SS.B.1.4, LA.C.3.4, AT.5.1.4
  - 08.02 Perform boundary survey closing from field notes. LA.A.1.4, MA.E.1.4, SS.A.2.4, SS.B.1.4, SC.H.4, SC.H.3.4, AT.5.2.4
  - 08.03 Demonstrate knowledge and use of survey equipment. LA.A.1.4, LA.A.2.4, LA.C.1.4, LA.C.3.4, SS.B.1.4, AT.5.1.4
- 09.0 UNDERSTAND THE CONCEPT OF BALANCE OF STRUCTURE--The student will be able to:
- 09.01 Identify the forces of equilibrium (both internal and external). SC.C.2.4, MA.B.1.4, MA.C.3.4, MA.D.2.4, LA.A.1.4, SS.A.2.4, SS.A.5.4, AT.5.1.4
  - 09.02 Describe how strength of material affects the overall balance of a structure. MA.B.1.4, MA.C.3.4, MA.D.2.4, SC.C.2.4, LA.B.1.4, LA.B.2.4, LA.C.3.4, LA.D.2.4, AT.5.1.4
- 10.0 DEMONSTRATE MODEL BUILDING, USING CIVIL ENGINEERING PRINCIPLES--The student will be able to:

- 10.01 Develop the sense of scale. MA.A.4.4, SS.B.1.4, SC.H.3.4, AT.5.1.4
  - 10.02 Understand a regional master site plan. AT.1.1.4, LA.A.1.4, LA.A.2.4, LA.D.2.4, SS.B.2.4, AT.5.2.4
  - 10.03 Participate in a model building project. MA.B.1.4, HE.A.1.4, HE.C.1.4, HE.C.2.4, LA.A.1.4, LA.A.2.4, LA.B.2.4, LA.C.1.4, LA.C.3.4, LA.D.1.4, LA.D.2.4, AT.5.2.4
- 11.0 DEMONSTRATE BASIC COMPUTER SKILLS--The student will be able to:
- 11.01 Demonstrate keyboarding skills. AT.5.1.4, AT.5.2.4
  - 11.02 Use word processing software. AT.5.1.4, AT.5.2.4
  - 11.03 Use spread sheet software. AT.5.1.4, AT.5.2.4
  - 11.04 Use AutoCAD software. AT.5.1.4, AT.5.2.4

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8915030  
**Course Title:** Civil Engineering Aide 3  
**Course Credit:** 1

**COURSE DESCRIPTION:** This course provides laboratory experiences and begins preparing students for the practicum. Instruction in beginning surveying, drafting, and business related skills are included.

12.0 ASSIST TRANSPORTATION PLANNERS IN DEVELOPING SPECIFICATIONS AND MATERIALS FOR TRAFFIC ENGINEERING--The student will be able to:

- 12.01 Collect and interpret data for origin/destination studies. MA.E.1.4, SC.H.1.4, LA.A.1.4, LA.A.2.4, LA.C.1.4, LA.C.2.4, LA.D.2.4, HE.A.1.4, HE.C.1.4, SS.A.3.4, SS.A.5.4, AT.5.2.4
- 12.02 Collect and analyze traffic signal timing data. MA.E.1.4, SC.C.1.4, SC.H.1.4, SC.H.2.4, LA.A.1.4, LA.A.2.4, LA.C.1.4, LA.C.2.4, LA.D.2.4, AT.5.2.4
- 12.03 Perform traffic counts. MA.E.1.4, SC.H.1.4, LA.B.2.4, AT.5.2.4
- 12.04 Collect and interpret demographic data. MA.E.1.4, SC.H.1.4, SC.H.3.4, LA.A.1.4, LA.A.2.4, LA.C.1.4, LA.C.2.4, LA.D.2.4, HE.A.1.4, HE.C.1.4, AT.5.2.4

13.0 PREPARE PROJECT DRAWINGS AND SUPPORTING DOCUMENTS--The student will be able to:

- 13.01 Demonstrate the ability to read and interpret civil engineering drawings. MA.C.1.4, LA.A.1.4, LA.A.2.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4, SS.B.1.4, AT.5.2.4
- 13.02 Prepare site plan and grading and drainage plan. MA.B.4.4, MA.D.2.4, MA.C.3.4, LA.B.1.4, LA.B.2.4, LA.D.2.4, AT.5.1.4, AT.5.2.4
- 13.03 Plot roadway cross sections, plan and profiles. SC.H.1.4, SC.H.2.4, LA.A.1.4, LA.D.2.4, MA.C.2.4, AT.5.2.4
- 13.04 Prepare roadway typical section templates.
- 13.05 Save and back-up Auto-CADD drawing files. LA.D.2.4, AT.5.1.4, AT.5.2.4

14.0 DEMONSTRATE AN UNDERSTANDING OF THE BUSINESS OF CIVIL ENGINEERING--The student will be able to:

- 14.01 Describe the role and job descriptions of civil engineering staff members. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4, LA.D.1.4, LA.D.2.4, SS.A.2.4, HE.A.1.4, HE.B.2.4, AT.5.1.4
- 14.02 Describe the roles and responsibilities of various entities involved in a construction project (contractor, supplier, engineer, owner, government and lending agencies). LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4, LA.D.1.4, LA.D.2.4, SS.C.2.4, SC.H.3.4, AT.5.1.4
- 14.03 Describe the roles of agencies and their purposes: OSHA, ASTM, ACI, ASSHTO, and FDOT. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4, LA.D.1.4, LA.D.2.4, SS.B.2.4, AT.8.1.4, HE.A.1.4, HE.C.1.4

- 14.04 Discuss legal and ethical implications of the civil engineering profession. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4, LA.D.1.4, LA.D.2.4, HE.A.1.4, HE.C.1.4, SC.G.2.4, SC.H.1.4, SC.H.3.4, AT.5.1.4
- 14.05 Discuss certification and/or licensure required for various workers employed in the civil engineering field, i.e.; Certified Engineering Technician, and education and/or experience needed. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4, LA.D.1.4, LA.D.2.4, AT.5.1.4
- 14.06 Demonstrate basic knowledge of land surveying. MA.B.1.4, MA.B.2.4, MA.B.3.4, MA.B.4.4, MA.C.1.4, MA.D.2.4, MA.E.1.4, LA.A.1.4, SS.B.1.4, AT.5.1.4
- 14.07 Develop a site plan. MA.B.1.4, MA.B.2.4, MA.B.3.4, MA.B.4.4, MA.C.1.4, MA.D.2.4, MA.E.1.4, LA.B.1.4, LA.B.2.4, AT.5.2.4
- 14.08 Complete a basic roadway design. MA.B.1.4, MA.B.2.4, MA.B.3.4, MA.B.4.4, MA.C.1.4, MA.D.2.4, MA.E.1.4, SS.A.3.4, AT.5.2.4
- 14.09 Perform a simple structure analysis. MA.B.1.4, MA.B.2.4, MA.B.3.4, MA.B.4.4, MA.C.1.4, MA.D.2.4, MA.E.1.4, AT.5.2.4

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8915040  
**Course Title:** Civil Engineering Aide 4  
**Course Credit:** 1

**COURSE DESCRIPTION:** This course provides practical experience in the civil engineering industry. Students will demonstrate employability skills. It is a practicum that covers all aspects of Civil Engineering Aide employment. Civil Engineering Aide 1, 2, and 3 are pre-requisites to this course.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 15.01 Conduct a job search. AT.5.1.4
- 15.02 Secure information about a job. AT.5.1.4
- 15.03 Identify documents that may be required when applying for a job. AT.5.1.4
- 15.04 Complete a job application. AT.5.1.4
- 15.05 Demonstrate competence in job interview techniques. AT.5.1.4
- 15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons. AT.5.1.4
- 15.07 Identify acceptable work habits. HE.B.1.4, HE.B.3.4, AT.5.1.4
- 15.08 Demonstrate knowledge of how to make job changes appropriately. AT.5.1.4
- 15.09 Demonstrate acceptable employee health habits. HE.B.1.4
- 15.10 Investigate areas of specialty in civil engineering. AT.5.1.4

16.0 IDENTIFY THE PURPOSES AND USES OF CIVIL ENGINEERING DOCUMENTS AND/OR FORMS--The student will be able to:

- 16.01 Describe the civil engineering uses of a Patent notebook and/or diary. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, LA.C.3.4, AT.5.1.4
- 16.02 Describe the laboratory comprehensive quality assurance plan (COMP-QAP) as it relates to civil engineering testing procedures. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4, LA.C.3.4, AT.5.2.4
- 16.03 Identify sources of errors in forms and demonstrate techniques for minimizing errors. MA.B.4.4, AT.5.2.4

17.0 DEMONSTRATE THE PRACTICAL APPLICATION OF CIVIL ENGINEERING SKILLS--The student will be able to:

- 17.01 Identify the environmental impact of a civil engineering project. LA.A.1.4, LA.A.2.4, SC.D.2.4, SS.A.5.4, SS.B.2.4, HE.A.1.4, HE.B.2.4, HE.C.1.4, AT.5.2.4
- 17.02 Describe the economics of civil engineering projects. MA.B.1.4, MA.B.2.4, MA.B.3.4, MA.B.4.4, MA.C.1.4, MA.D.2.4, MA.E.1.4, LA.B.1.4, LA.B.2.4, LA.C.3.4, LA.D.1.4, LA.D.2.4, SS.D.1.4, AT.5.2.4

- 17.03 Develop an urban transportation plan. MA.B.1.4, MA.B.2.4,  
MA.B.3.4, MA.B.4.4, MA.C.1.4, MA.D.2.4, MA.E.1.4, LA.B.1.4,  
LA.B.2.4, SS.A.5.4, AT.5.2.4
- 17.04 Identify the required licensing for civil engineering.  
LA.A.1.4, LA.A.2.4, AT.5.2.4