

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
CTSO FPSA
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 (OES 22521A), mapping technicians (OES 22521B), civil engineering aides or surveyors helpers (industry title) assisting civil engineers, surveyors, or urban planners.

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 vocational 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) is the appropriate career and technical student organization (CTSO) for providing leadership training and for reinforcing specific vocational skills. CTSOs, when provided, shall be an integral part of the vocational 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 vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which 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).

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 - OES 22521A

Mapping Technician - OES 22521B

01.0 Demonstrate employability skills.

02.0 Assist civil engineers in collecting and analyzing soil samples, surveying and mapping.

- 03.0 Demonstrate command of mathematical formulae for geometric designs.
- 04.0 Demonstrate basic communications skills.
- 05.0 Demonstrate basic math skills.
- 06.0 Practice work place safety.
- 07.0 Take photographs for legal uses.
- 08.0 Demonstrate beginning knowledge of drainage and geologic concepts.
- 09.0 Assist urban planners in developing specifications and materials for special housing centers.
- 10.0 Operate surveying instruments.
- 11.0 Prepare drawings and sketches.
- 12.0 Demonstrate basic computer skills.
- 13.0 Demonstrate an understanding of the business of civil engineering.
- 14.0 Demonstrate familiarity of civil engineering legal documents and/or forms.

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. Employability skills and work place safety are included.

OCCUPATIONAL COMPLETION POINT - DATA CODE A

Surveying Technician - OES 22521A
Mapping Technician - OES 22521B

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

- 01.01 Conduct a job search.
- 01.02 Secure information about a job.
- 01.03 Identify documents that may be required when applying for a job.
- 01.04 Complete a job application.
- 01.05 Demonstrate competence in job interview techniques.
- 01.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
- 01.07 Identify acceptable work habits.
- 01.08 Demonstrate knowledge of how to make job changes appropriately.
- 01.09 Demonstrate acceptable employee health habits.

02.0 ASSIST CIVIL ENGINEERS IN COLLECTING AND ANALYZING SOIL SAMPLES, SURVEYING AND MAPPING--The student will be able to:

- 02.01 Prepare sample tags for test specimens.
- 02.02 Show ability to take a disturbed soil sample.
- 02.03 Properly hold level rod and the chain.
- 02.04 Trace topographic map details.

03.0 DEMONSTRATE COMMAND OF MATHEMATICAL FORMULAE FOR GEOMETRIC DESIGNS--The student will be able to:

- 03.01 Calculate missing elements of right triangles.
- 03.02 Calculate volume and area of rectangles, squares, triangles, parallelograms, cylinders, cones, and spheres.

04.0 DEMONSTRATE BASIC COMMUNICATION SKILLS--The student will be able to:

- 04.01 Define unfamiliar civil engineering terms by use of structural analysis, decoding, contextual clues or by using a dictionary.
- 04.02 Distinguish factual reports and personal opinion.

04.03 Demonstrate ability to report observations in written or oral form.

05.0 DEMONSTRATE BASIC MATH SKILLS--The student will be able to:

05.01 Draw, read, analyze and report on graphs, charts, and tables.

05.02 Measure time, temperature, distance, capacity and mass/weight.

05.03 Make and use measurements in both traditional and metric units.

05.04 Make estimates and approximations and judge the reasonableness of the result.

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

06.01 Identify hazards related to civil engineering and prevention of injury.

06.02 Describe and practice safety techniques related to confined entry conditions, handling chemicals and materials, spill controls, etc.

06.03 Select and wear protective apparel.

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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.

07.0 TAKE PHOTOGRAPHS FOR LEGAL USES--The student will be able to:

- 07.01 Take Polaroid photographs.
- 07.02 Take photographs with single lens reflex.
- 07.03 Compose photographs.

08.0 DEMONSTRATE BEGINNING KNOWLEDGE OF DRAINAGE AND GEOLOGICAL CONCEPTS--The student will be able to:

- 08.01 Demonstrate knowledge of a water budget.
- 08.02 Demonstrate knowledge of stream behavior.
- 08.03 Recognize soil types.

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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.

09.0 ASSIST URBAN PLANNERS IN DEVELOPING SPECIFICATIONS AND MATERIALS FOR SPECIAL HOUSING CENTERS--The student will be able to:

- 09.01 Collect data for origin/destination studies.
- 09.02 Collect traffic signal timing data.
- 09.03 Perform traffic counts.
- 09.04 Collect demographic data.

10.0 OPERATE SURVEYING INSTRUMENTS--The student will be able to:

- 10.01 Operate the following instruments:
 - a. Rod and Rod level.
 - b. Chain, thermometer, tension pull, and barometer.
 - c. Set up engineer's level.
 - d. Set up engineer's transit.

11.0 PREPARE DRAWINGS AND SKETCHES--The student will be able to:

- 11.01 Demonstrate the ability to read and interpret civil engineering drawings.
- 11.02 Plot cross sections and profiles.
- 11.03 Trace cross section templates.
- 11.04 Plot lot boundaries.
- 11.05 Store and retrieve maps.

12.0 DEMONSTRATE BASIC COMPUTER SKILLS--The student will be able to:

- 12.01 Demonstrate keyboarding skills.
- 12.02 Use word processing software.
- 12.03 Use spread sheet software.
- 12.04 Use Auto CADD software.

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

- 13.01 Describe the role and job descriptions of civil engineering staff members.
- 13.02 Describe the roles and responsibilities of various entities involved in a construction project (contractor, supplier, engineer, owner, government and lending agencies).
- 13.03 Describe the roles of agencies and their purposes; OSHA, ASTM, ACI, ASSHTO, and FDOT.

13.04 Discuss legal and ethical implications of the civil engineering profession.

13.05 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.

14.0 DEMONSTRATE FAMILIARITY OF CIVIL ENGINEERING LEGAL DOCUMENTS AND/OR FORMS--The student will be able to:

14.01 Describe a Patent notebook and/or diary.

14.02 Describe a laboratory comprehensive quality assurance plan (COMP-QAP).

14.03 Identify sources of errors in forms and demonstrate techniques for minimizing errors.

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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. It is a practicum that covers all aspects of Civil Engineering Aide employment. Civil Engineering Aide 1, 2, and 3 are pre-requisite to this course.