as of August 2004

Civil & Surveying
Technology Program
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Course Descriptions

AP TECH 54A Introduction to Geographic Information Systems (GIS)

2 units each 1.5 hours lecture, 1.5 hours laboratory.
Recommended: A working knowledge of the IBM compatible computer system is advised.
54B Prerequisite: Ap Tech 54A or the equivalent.
An introduction to geographical information systems (GIS), including their use, input, analysis and output of spatial data. Topics include elements of a GIS, data structures and their management, and basic input and output functions and mapping possibilities. Hands-on exposure to computers and the current Arc-View, GIS software package is provided during laboratory. (CSU)

AP TECH 54B Advanced ArcView (GIS)

2 units each 1.5 hours lecture, 1.5 hours laboratory.
Prerequisite: Ap Tech 54A or the equivalent.
An advanced course in the uses of Geographic Information Systems (GIS) using ArcView software. Topics covered are geo-coding, creating and editing shape files, customizing ArcView and Avenue, geo-processing and spatial analysis, tabular database management and advanced layout techniques. Hands-on exposure to computers and the current Arc-View, GIS software package is provided during laboratory. (CSU)

AP TECH 55 Basic Drafting Skills

1.5 units 2 hours lecture, 3 hours laboratory for 8 weeks.
Introduction to basic manual drafting skills, this course will teach the student how to use drafting tools; the development of line work and lettering skills; the procedures for executing geometric construction; techniques of freehand drafting; and fundamentals of orthographic projections and isometric drawing. (CSU/UC)

AP TECH 56 Introduction to AutoCAD

2 units 2 hours lecture, 3 hours laboratory, 3 hours by arrangement for 8 weeks.
Prerequisite: Ap Tech 55 with a grade of "C" or better or the equivalent.
Introduction to computer-aided drafting utilizing the AutoCAD software program. Course will teach the student how to use this Windows-based commercial software to execute professional quality drafting/design work. Particular attention will be given to the components of a CAD system, the software interface, drawing set-up, geometric construction & editing, orthographic projection, dimensioning, plotting, and an introduction to 3-dimensional drafting/design. (CSU/UC)

AP TECH 57 Advanced AutoCAD

3 units 2 hours lecture, 3 hours laboratory, 2 hours by arrangement.
Prerequisite: Completion of APTECH 56 (or ENGR 56 or ENGR 22) with a grade of "C" or better or the equivalent.
Computer-aided drafting using the AutoCAD software program. Areas covered include: advanced layout, construction and editing techniques, advanced dimensioning practices, isometric drawing, 3D modeling and rendering, software customization and project-oriented architectural, civil and mechanical engineering applications. (CSU)

AP TECH 90A Applied Mathematics

4 units each 4 hours lecture. Grade only.
Recommended: Standard 1st year HS algebra course with "C" or better or successful completion of MATH 150B or MATH 151 within the last four years. An investigation of intermediate algebra topics with emphasis on the investigation and application of polynomials and rational expressions, rational exponents, equations and inequalities, functions and relations, exponential and logarithmic functions, sequence and series and binomial theorem, theory of equations, and an introduction to numerical trigonometry involving trigonometric functions, tables, and applications of the right triangle to problems encountered in surveying, civil engineering, construction technology, electronic and related engineering technologies. (CSU)

AP TECH 90B Applied Mathematics

4 units each 4 hours lecture. Grade only.
Prerequisite: Completion of Ap Tech 90A.
A course in quantitative reasoning which applies trigonometry principles to problems encountered in surveying, civil engineering, construction, electronics and related engineering technologies. The areas of study are the analysis, solution and application of angle measurements and their related functions, associated graphical representations, solution to triangles, complex numbers and analytic geometry, as they are related to the trades and various technologies.
(CSU)

CEST 51 Civil Drafting Technology
3 units 2 hours lecture, 4 hours laboratory
Prerequisite: Ap Tech 56 or equivalent with a grade of "C" or better.
Theory and practice of civil engineering drafting and mapping. An introduction to computer-aided design/drafting software for civil, surveying and land development disciplines. Topics include mapping scales and symbols, civil and surveying fundamentals, location and direction, plan, profile, and cross section drawings, topographic mapping, boundary and legal description plats.

CEST 62 Soils and Materials Testing
3 units 2 hours lecture, 3 hours laboratory
Prerequisite: Ap. Tech. 90B or equivalent with a grade of "C" or better.
Characteristics and properties of engineering and construction materials and standard methods of testing soil, building and construction materials.

CEST 63 Subdivision Planning
3 units 2 hours lecture, 3 hours laboratory
Prerequisite: CEST 81 or their equivalent with a grade of "C" or better.
Purpose and objectives of subdivision regulations with an emphasis on preparation of tentative and final subdivision maps. Land development, urban planning, local, state and federal agency requirements and implementing the process is discussed.

CEST 81 Engineering Construction Design/Drafting
3 units 2 hours lecture, 3 hours laboratory
Prerequisite: CEST 50B & CEST 51 or their equivalent with a grade of "C" or better.
Computer aided design and drafting techniques as applied to engineering construction projects. Improvement plans for roadway and highway projects, details, design standards, underground utilities, and structures, grading plans and site development. Geometric and structural roadway designs, estimating and specification writing.

CEST 85 Civil Engineering Computer-Aided Design/Drafting
3 units 2 hours lecture, 3 hours laboratory
Prerequisite: CEST 51 or their equivalent with a grade of "C" or better.
Computer aided design and drafting for the civil and surveying technician. The Land Development Desktop civil engineering software program will be utilized. Areas covered include input of surveying data for boundary and topography. Creation of a digital terrain model, roadway alignments, earthwork, grading plan, plan view, profile view and cross section drawings, utilities, details and boundary plats as they relate to the civil engineering and land surveying field.

CEST 86 Advanced Civil Engineering Computer-Aided Design
3 units 2 hours lecture, 3 hours laboratory
Prerequisite: CEST 85 or their equivalent with a grade of "C" or better.
Advanced computer-aided design for civil engineering technicians. The Land Development Desktop civil engineering software program will be utilized. Advanced civil engineering design topics will be covered in the course using the Advanced Design, Digital Terrain Modeling, Earthworks and Survey modules. Advanced design techniques in digital terrain modeling, surface editing, alignment editing, plan, profile, cross sections, earthwork computations and site planning and design. (CSU)

CEST 98 Special Studies in Civil & Surveying Technology
1 to 3 units 1-3 scheduled hours, 2-6 arranged hours
Prerequisite: Application to the department.
Seminars or individual conferences by arrangement to provide for independent study and enriched academic experience.

CEST 192 Non-technical skills for the Technician
1.5 units 2.4 hours of lecture for 10 weeks
An introduction to the important non-technical skills used by the civil and surveying technician and other people in technical careers. This course will concentrate on individual and group skills, verbal and written communication, people skills, listening and understanding yourself. Students will participate in a personal profile system to better understand their strengths and weaknesses in areas of communication, relationships with co-workers and the industry. This course will also cover job-hunting skills such as networking, resume writing, interviewing, work place politics, and dealing with bureaucracies. Classroom exercises dealing with personal attitude, credibility, teamwork, prioritizing projects, written and verbal skill communication and active listening will augment assignments and various career opportunities.

CEST 399 Selected Topics in Civil & Surveying Technology
0.5 to 2 units Hours vary. CR/NC only
Prerequisite: Application to the department.
A series of short courses dealing with a specific topic of relevance to civil and surveying technology.

SURV 50 Introduction to Plane Surveying
4 units each 3 hours lecture, 3 hours laboratory
Co-requisites of enrollment in Ap. Tech 90A or Math 155 or equivalent.
Introduction to the principles and practice of plane surveying, including measurements for distance, direction, elevation and position, topographic and planimetric mapping, use and care of surveying equipment.

SURV 51 Plane Surveying Applications
4 units each 3 hours lecture, 3 hours laboratory
Prerequisite: SURV 50 or equivalent with a grade of "C" or better.
Theory and practice of plane surveying, including principles of position, horizontal and vertical curves, construction staking, alignments, field procedures, U.S. Public Land Survey System, Boundary Surveying, use and care of surveying equipment. All students should have a basic understanding of the principles and practices of plane surveying equipment prior to taking this course.

SURV 52 Introduction to Photogrammetry
3 units 3 hours lecture
Prerequisite: SURV 51 or equivalent with a grade of "C" or better.
Introduction to the theory and practice of Photogrammetry including image systems and quality, theory of stereo-photography, orientation and design of stereo models. Design and operating principles of stereo plotting, photogrammetric and orthophoto mapping and project planning. All students should have a basic understanding of the principles and practices of plane surveying prior to taking this course.

SURV 53 Route Surveying & Design
4 units 3 hours lecture, 3 hours laboratory
Prerequisite: SURV 51 and CEST 51 or their equivalent with a grade of "C" or better.
Route surveying methods and design. Geometric design and construction staking of routes and interchanges. Use and care of electronic surveying equipment and computers. Introduction to Photogrammetry and global positioning systems.

SURV 54 Applications of Electronic Surveying Measurements
2 units 3 hours lecture, 3 hours laboratory, 8 week course
Prerequisite: SURV 50A or equivalent with a grade of "C" or better.
Principles and applications of electronic surveying measurements, calibration and use of EDM's, total stations and data collectors for land surveying and construction layout.

SURV 55 GPS for Civil, Surveying & Development
2 units 3 hours lecture, 3 hours laboratory, 8 week course
Prerequisite: SURV 50A or equivalent with a grade of "C" or better.
Principles and applications of control surveys, coordinate systems, and global positioning systems including concepts and practice of navigation, location, data collection, processing and adjustment. All students should have a basic understanding of the principles and practices of plane surveying prior to taking this course.

SURV 58 Evidence & Procedures for Boundary Determination
3 units each 3 hours lecture.
Prerequisite: SURV 51 or equivalent with a grade of "C" or better.
Introduction to the concepts of the evidence used, historic development, current concepts and procedures used in boundary determination. This is the first of two courses developed for those interested in a gaining a better understanding of boundary and legal principles. This course is designed for those in the field of civil engineering, land surveying, real estate and title insurance. All students should have a basic understanding of the principles and practices of plane surveying prior to taking this course.

SURV 59 Boundary Control & Legal Principles
3 units each 3 hours lecture.
Prerequisite: SURV 51 or equivalent with a grade of "C" or better.
Introduction to the concepts in boundary control and legal principles associated with the history and current concepts of boundary line and property corner location. This is the second of two courses developed for those in the field of land surveying, civil engineering, title insurance and real estate interested in a gaining a better understanding of boundary and legal principles. All students should have a basic understanding of the principles and practices of plane surveying prior to taking this course.