

# DRAFTING AND ENGINEERING SUPPORT (DES)

## DES 0001. Technical Drafting I

*Units: 3*

Formerly known as EST 1

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Fundamental use of design equipment to create both two dimensional technical sketches and two and three dimensional computer generated (CAD) working drawings that are used for product definition. Introduction to product and process definition as specified by engineering design disciplines. This course teaches introductory 3D AutoCAD skills.

Designed for students with no previous experience in engineering design/drafting. (CSU)

## DES 0002. Technical Drafting II

*Units: 3*

Formerly known as EST 2

Prerequisite: Completion of DES 1 with grade of "C" or better or equivalent as determined by instructor

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Intermediate concepts of engineering design including sections, auxiliaries, threads, fasteners, and dimensional tolerancing. Basic concepts of Geometric Dimensioning and Tolerancing. Design for manufacturability and assembly explored to include material selection and properties of materials. This course teaches intermediate/advanced 3D AutoCAD skills. Designed for students who have attained a fundamental knowledge of the processes and practices of engineering design/drafting. (CSU)

## DES 0003D. Design for Additive Manufacturing - 3D Printing

*Units: 3*

Hours: 90 (36 lecture, 54 laboratory)

Introduction to design for 3D printing through machine operation and use of design software to create geometric models to satisfy defined requirements. Introduction to product design process and exploration of additive manufacturing (3D printings) impact on that process, as well as manufacturing. Designed for students with no prior experience with 3D printing or design. (not transferable)

## DES 0010. Civil Applications of Computer-Aided Design

*Units: 3*

Formerly known as EST 10

Prerequisite: Completion of DES 2 or 20 with grade of "C" or better or equivalent as determined by instructor

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Development of drafting skills used in the areas of industrial and civil engineering support. Emphasis on land division, determination of location and direction, development of plots based upon legal description and the fundamentals of utilizing surveying data as applied to preliminary and final maps. Designed for students who have attained an intermediate knowledge of the processes and practices of engineering design/drafting support. Introduction to AutoCAD Civil 3D software. (CSU)

## DES 0011. Three-Dimensional Modeling

*Units: 3*

Formerly known as EST 11

Prerequisite: Completion of DES 2 or DES 3D or MECH 44 or ENGR 22A or ADVM 66 with grade of "C" or better; or equivalent as determined by instructor

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Processes employed in developing design solutions using a feature based parametric solid modeler. Includes 3D part and assembly modeling, and the development of 2-dimensional part, assemblies, welding and sheet metal drawings per ASME standards. SolidWorks is the solid modeler used. (CSU, UC)

## DES 0012. Geometric Dimensioning and Tolerancing

*Units: 3*

Formerly known as EST 12

Prerequisite: Completion of DES 2 or DES 11 or ADVM 66 or ENGR 22B with grade of "C" or better or equivalent as determined by instructor

Hours: 54 lecture

Expands upon basic knowledge of dimensioning mechanical drawings by adding form and feature controls in order to clearly define parts. Review of basic dimensioning and tolerancing. Topics, as defined in ASME Standards, include geometric tolerancing symbols and terms, rules of geometric dimensioning and tolerancing, datums, material condition symbols, tolerances of form and profile, tolerances of orientation and runout, location tolerances and virtual condition. (CSU)

## DES 0020. Architectural Drawing I

*Units: 3*

Formerly known as EST 20

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Introduction to the fundamentals of residential construction and design documentation. Drawings of a residence are developed and detailed, to include sketches, site plan and floor plans, foundation, elevations, and section views. AutoCAD instruction is incorporated to develop CAD drawings and electronic data sets. (CSU)

## DES 0021. Architectural Drawing II

*Units: 3*

Formerly known as EST 21

Prerequisite: Completion of DES 20 with grade of "C" or better or equivalent as determined by instructor

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Advances the skills and knowledge of residential architectural drawing production started in DES 20. Course focuses on production of residential architectural drawings of a 2-story wood framed house in the context of current and relevant building codes, construction materials and methods, industry standard work flow, production and graphic standards through the use of a drawing software application. Additional skills of software utilization, drawing management, complex drawing creation and printing will be covered. This course teaches intermediate AutoCAD skills. (CSU)

## DES 0022. Architectural Drawing III-BIM (Building Information Modeling)

*Units: 3*

Prerequisite: Completion of DES 21 with grade of "C" or better or equivalent as determined by instructor

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Continuation of the architectural design started in DES 20 and 21. Students utilize Building Information Modeling (BIM) using REVIT software to develop commercial architectural documentation (including electronic data sets) in adherence to the International Building Code (IBC) and local county and state codes. (CSU)

**DES 0028. Independent Study**

*Units: 1-3*

Formerly known as EST 28

Designed for students interested in furthering their knowledge at an independent study level. Independent study might include, but is not limited to, research papers, special subject area projects, and research projects. See Independent Study page in catalog. (CSU)

**DES 0040. Managing the Computer-Aided Design (CAD) Environment**

*Units: 3*

Formerly known as EST 40

Prerequisite: Completion of DES 10, 11 or 22 with grade of "C" or better, or equivalent as determined by instructor

Advisory: Completion of DES 3D with grade of "C" or better

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Designed for the advanced Drafting and Engineering Support student. Topics include proper CAD management skills and the development of "as built" models used in the manufacturing, architectural and civil disciplines. Focus on utilizing, creating and instituting CAD standards, policies and procedures. Development of prototypes integral to the design process in their chosen area of concentration (mechanical, civil and/or architecture). (CSU)

**DES 0095. Internship in Drafting and Engineering Support**

*Units: 0.5-4*

Formerly known as EST 95

Designed for advanced students to work in an area related to their educational or occupational goal. Provides new on-the-job technical training under the direction of a worksite supervisor, allowing students to expand knowledge and skills in the chosen field. Mandatory orientation session and faculty approval to determine eligibility. One unit of credit is equal to each 60 hours of non-paid work, or each 75 hours of paid work. Students may earn up to a total of 16 units in internship courses (any course numbered 95 and PDEV 94). (CSU-with unit limitation)