

COURSE

DRFT 1234 Engineering Graphics I

CATALOG DESCRIPTION

This course introduces drawing fundamentals, including orthographic projection, geometric design and construction, lettering, dimensioning, sectioning, auxiliaries and sketching.

PREREQUISITES

None, recommended in conjunction with DRFT 2143 or 2253

CREDIT HOURS

4 credit hours, counting toward all of the CADD Program Degree Options and Certificate Programs

TARGET AUDIENCE AND TRANSFER

As a component of the Associate of Applied Science degree in Engineering, DRFT 1234 is an introductory course in engineering design and drawing. This AAS degree program is designed for those students who expect to seek employment upon completion. Employed individuals can acquire the formal training needed to prepare for advancement in a present job or to step into another career.

GENERAL COURSE OBJECTIVES The four general goals of this course are:

- ◆ Provide students the opportunity to develop basic drafting skills through assignments with increased levels of difficulty.
- ◆ Introduce students to the standards and codes that define engineering drawing and design in industry.
- ◆ Introduce students to drafting techniques that produce engineering drawings of high quality.
- ◆ Provide students with the opportunity to complete a project using a typical engineering drawing development process.

LEARNING OBJECTIVES establish that a successful student will be able to:

1. Use their intellect
2. Share divergent views as expressed in research
3. Examine and grow in understanding of values
4. Participate in criteria that are clearly defined, coherent, and intellectually rigorous
5. Resolve to a level of proficiency in skills and competencies essential for college-educated adults
6. Engage critical thinking skills and independent problem solving
7. Combine theory and application

TECHNOLOGY OBJECTIVES establish that a successful student will be able to:

1. Demonstrate fundamental technical skills necessary for a variety of occupational settings.
2. Apply principles of design and drafting technologies and problem solving to complete a variety of project tasks.
3. Share new production techniques and topics with business and industry.
4. Perform within guidelines that are ethical and practical to a mix of businesses.
5. Meet the changing demands of our regional engineering technology workforce.

REQUIRED TEXTS, RESOURCES, AND SUPPLIES

Text Engineering Drawing and Design by Madsen, Shumaker, Turpin and Stark

Supplies Drafting Kit (includes drafting board, T-square, scale, pencils, triangles and all other equipment needed)
Vellum drafting paper

Drawing Resources

NWACC CADD Faculty is a collective group of licensed professionals in fields of Architecture, Landscape Design, and Engineering. Students are encouraged to ask any CADD faculty for particular details and drawing reference data. The Northwest Arkansas Community College has a limited supply of reference documents due to the nature of copyright laws.

CAD PROGRAM SURVEY

All CADD Degree Program students must respond to the CAD program survey. This survey, given to all program students on the first day of class, is used to set responsive computer lab hours, identify program option interest, and include student feedback into the overall course outline for a particular semester.

TOPICS (REQUIRED COVERAGE) Engineering Graphics I

(Introduction to Engineering Drawing) Introduces students to engineering graphics as a profession and includes occupations, professional organizations, opportunities and the engineering design process. The correct use of drafting instruments and equipment are taught including engineers, architects and metric scales. Standard engineering drawing sheet media, title block elements and common reproduction and drawing storage methods are discussed.

(Sketching, lines, lettering and geometric construction) Topics include the development of isometric sketches, linework standards and representation, and the geometric construction of bisectors, tangencies, and standard geometric shapes seen in engineering drawing and design field.

(Multiviews and Auxiliary Views) Students become proficient in the development of single and multiviews drawings in accordance with ANSI/ASME standards. Topics include proper view selection and placement, first- and third-angle projection and the development of primary and secondary auxiliary views.

(Sections, Revolutions and Conventional Breaks) Topics include every type of sectioning practice used in engineering drafting, proper cutting –plane and view representations, conventional revolutions and breaks, and unsectioned features.

(Descriptive Geometry) Students will learn how to correctly project a point or line in a different projection plane, create a fold line to establish a new projection plane, find the end views and the true lengths of lines, and find the true size and shape of a plane graphically using the relationships between points, lines, and planes.

(Manufacturing Processes) This section is an introduction to manufacturing processes including product development, manufacturing materials, hardness and testing, casting and forging methods, machining processes, computer numerical control (CNC), computer-integrated manufacturing (CIM), surface texture and the design and drawing representation of machined features.

(Dimensioning) Students will learn how to fully dimension a multi-view drawing in accordance with ANSI/ASME standards. Topics include the various dimensioning systems, rules, preferred industry practices, specific and general drawing notes, standard dimensioning symbols, tolerancing, and dimensioning for CAD/CAM.

(Fasteners and Weldments) This section covers the complete range of fastening devices and welding processes used in mechanical design including screw threads, thread cutting, thread forms, thread representations, washers, dowels, pins, rings, keys and keyseats, rivets and springs. The welding instruction includes an introduction to welding processes, drawings and symbols, weld types, welding specifications weld testing annotations on drawings.

(Individual Student Project) – During the final two weeks of the course, students will complete an individual engineering design project which uses the skills learned in this course. This project will be approved by the instructor and will be of size and scope that allows for completion by the end of the course.

COURSE INFORMATION FOR INSTRUCTORS ONLY

CONTACT/ LOAD HOURS: 4 contact hours per week / 4 load hours for remuneration.

REQUIRED INSTRUCTIONAL ACTIVITIES

- ◆ It is required that all instructors who teach this course cover all the topics listed above. If difficulties arise, early contact must be made with the lead faculty to find and share ideas to deliver remaining content. Naturally, no optional section can be done in lieu of required section(s).
- ◆ Individual instructors' syllabi must contain any required components. The upper portion of this course outline may be distributed but is not sufficient alone as a syllabus.
- ◆ Topics listed as General, Learning, & Technology Objectives should be covered thoroughly enough so students can smoothly transition into the next course sequence.
- ◆ A key objective for every course is that students should be able to work through the applications in any covered section. Student success in Engineering Graphics I is dependent on these skills. Instructors may bring in applications, but students must be able to perform those in the text as well. This translates to a smoother transition into Engineering Graphics II.
- ◆ Students should be required to attempt some of the harder questions at the end of chapter sections in the synthesis portion. This also helps the transition to later courses.
- ◆ Check student method and process, not just answers, to ensure that logical process and thinking are involved.
- ◆ The standard grading scale should be as follows, unless otherwise approved: [90,100%]=A, [80,90)=B, [70,80)=C, [60,70)=D
- ◆ A final exam or project is recommended to be comprehensive, must include application problems, proportionally represent the material covered in class, and be in the range of 10% - 25% of the final grade. The curving of final exam grades is discouraged.
- ◆ Given the full curriculum of required topics and beneficial optional content, instructors should conduct all classes for the duration of the class period.

INSTRUCTOR RESOURCES

1. Instructor supplements for Engineering Drawing and Design are available and may be obtained from the publisher.
2. Projection equipment is available in the MAT Rm. #106. Tack surfaces are available outside the room 106 door.
3. Faculty workrooms in most buildings offer computer, mail, and copier access, some classroom supplies, a phone, and storage space. Additional NWACC Library books, professional development resources, and databases can be used. Phone: 619-4244.
4. NWACC's Testing Center, 619-4317, can assist with testing accommodations.
5. NWACC Student Services and the Life Development Center can assist with Early Alert Referrals (619-4230), student recognition (619-4133), and the Office of Disabilities (619-4384).
6. The Faculty Handbook, NWACC Board of Trustees Policy Manual, and other materials are available in the division office and on the shared "K" drive of the College network.
7. Bound instructor syllabi from past semesters, indicating evaluation and attendance methods used, are available in the division office.