

COURSE

ENGR 2123 Advanced Engineering Graphics

CATALOG DESCRIPTION

This course covers advanced topics in engineering design and drafting and builds upon the concepts covered in the prerequisite courses. The Mechanical Desktop platform is used to create three-dimensional assembly models and the associated working drawing and bills of material. Emphasis is on accurate model building and the proper application of drawing views, sections, and dimensions needed for working drawings in an engineering environment.

PREREQUISITES

DRFT 1234, 1244, and 2143 or Consent of Instructor

CREDIT HOURS

3 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, ENGR 2123 is an advanced 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 general goals of this course are:

- ◆ Introduce students to the standards that define working drawings in industry.
- ◆ Introduce students to three-dimensional assembly modeling and the creation of the associated engineering drawings and Bills of Material.
- ◆ Introduce students to the advanced applications of dimensioning and tolerancing as applied to assembly drawings.
- ◆ Allow students to demonstrate their understanding of these concepts by applying them to typical engineering designs.

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 TBD

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) Advanced Engineering Graphics

(Three-dimensional assembly creation and building) This section covers the concepts of top-down and bottom-up assembly creation methods. Students will build mechanical assembly models, apply and edit constraints, and learn how to retrieve relative information from the models such as part interference data, minimum 3D distance, and mass property information.

(Assembly Drawings) Topics include the various types of assembly drawings and what is needed in a complete set of working drawings. Advanced geometric dimensioning and tolerancing concepts are covered and how to apply them to assembly drawings.

(The Bill of Material) The creation of the assembly Parts List from the Bill of Material database is covered. Methods of changing the format of the Parts List, adding and editing parts, and updating the Bill of Material are discussed. The addition and formatting of balloons on the drawing is covered.

(Advanced modeling concepts) Advanced concepts for features on single parts are also discussed including draft angles, shelling parts, splitting and combining two parts, and sweeps of threads and springs.

COURSE INFORMATION FOR INSTRUCTORS ONLY

CONTACT/ LOAD HOURS: 3 contact hours per week / 3 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 Geometric Dimensioning and Tolerancing 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 later courses.
- ◆ 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 the text 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.