CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

CADD TECHNOLOGY 128 – GEOMETRIC DIMENSIONING AND TOLERANCING (GDT)

3 hours lecture, 3 units

Catalog Description
Provides the complete fundamentals of Geometric Dimensioning and Tolerancing (GD & T) concepts as adopted by the American National Standard Institute (ANSI) standards: ASME (American Society for Mechanical Engineers)/ANSI Y14.5-2009. The importance of precision technique in conjunction with Computer-Aided Drafting and Design (CADD) is emphasized. The content of this course is considered to be one of the fundamental components to the engineering design and drafting profession.

Prerequisite
"C" grade or higher or "Pass" in CADD 120 or equivalent

Recommended Preparation
"C" grade or higher or "Pass" in CADD/ENGR 125 or equivalent

Entrance Skills
Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:
1) Use of AutoCAD terms, concepts and techniques in engineering drafting and design.
2) Application of AutoCAD in 2D geometric shapes and 3D modeling drawing.
3) Add dimensions and tolerances to drawings.
4) Perform AutoCAD editing commands to make necessary changes.

Course Content
Dimensioning and tolerancing engineering drawings using parametric software and other methods prescribed in the American National Standards Institute Document No. Y14.5M-2009, to include:
1) General application of dimensioning and tolerancing and related principles
2) Material condition and material boundary and applications
3) Form and orientation tolerances, and applications
4) Location and profile tolerances, and applications
5) Runout tolerances and applications

Course Objectives
Students will be able to:
1) Demonstrate the skills needed to dimension and tolerance engineering drawings using symbology, formulas and interpretations per the requirements of ASME/ANSI Y14.5M-2009 standards.
2) Explain the relationship between GD & T and the CADD system and utilize the tolerancing terms and concepts in dimensioning of engineering drawings.
3) Demonstrate and apply the material condition and material boundary.
4) Present and apply the form and orientation tolerances in engineering drafting and design.
5) Evaluate and analyze the location tolerances of working drawings.
6) Comprehend and apply the general GD & T to the working drawing to enhance the information for the drawing.

Method of Evaluation
A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.
1) Classroom and group activities which measure students' ability to articulate the fundamental concepts and skills used in the geometry involved with dimensioning and tolerancing.
2) Student portfolio of drawing exercises which measure students' ability to demonstrate skill and competency in using and applying dimensioning and tolerancing in conjunction with computer aided drafting tools for engineering drawings.
3) Final project which measures students' ability to use proper dimensioning techniques in engineering drawings in accordance with "ANSI" or "ISO" standards.
4) Midterm and final exam which measure students' ability to describe and apply proper dimensioning tolerancing concepts, terminology, and techniques in engineering graphics.

Special Materials Required of Student
Electronic storage media – Thumb drive, 2 GB

Minimum Instructional Facilities
CAD computer lab

Method of Instruction
Mechanical models and lectures using tests from text and work-along print reading exercises reinforced with videos

Out-of-Class Assignments
1) Weekly homework
2) Produce a portfolio of all activities, including in-class activity

Texts and References
1) Required (representative example): Madsen, David. *Geometric Dimensioning and Tolerancing*. 9th edition. Goodheart-Wilcox, 2013. ISBN 978-1-60525-938-3
2) Supplemental: None

Exit Skills
Students having successfully completed this course exit with the following skills, competencies and/or knowledge:
1) Use proper dimensioning techniques in accordance with industry standard.
2) Create drawings using ASME/ANSI standards.
3) Understand the use of datum plane and datum axis for proper dimensioning.
4) Use geometric tolerancing in areas of:
    a. Flatness, parallelism, straightness, circularity, angularity.
    b. Perpendicularity, profile, runout.
    c. Position, concentricity, symmetry.
5) Create a working drawing using all geometric tolerancing symbols from industry.

Student Learning Outcomes
Upon successful completion of this course, students will be able to:
1) Differentiate between maximum material condition (MMC) and least material condition (LMC) material conditions for the machining.
2) Interpret drawing applications specifying "regardless of feature size" (RFS) and "regardless of material boundary" (RMB) of the machined object.
3) Dimension and tolerance engineering drawings in accordance with national and international standards.

4) Use geometric tolerancing in areas of:
   a. Flatness, parallelism, straightness, circularity, angularity.
   b. Perpendicularity, profile, runout.
   c. Position, concentricity, symmetry