COLLEGE OF ENGINEERING
THE UNIVERSITY OF TOLEDO

University of Toledo
Mechanical Engineering Technology
Master Syllabus

Course Title: *Technical Drawing* **Course Code & Number:** *MET 1020*

Credit Hour Total: *3*

Lecture Contact Hours: *2* **Lab Contact Hours:** *2*

Prerequisite(s): *None*

Text: *Modern Graphics Communication, 5th Edition, Frederick E. Giesecke, 2018*

Software: *N/A*

Course Description: (Approved Catalog Description)
Essentials of dimensioning, size, position and form tolerancing and their application in shop processes. Pictorial drawings are created freehand and with the use of drawing instruments.

Related Program Outcomes:
(2) an ability to design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline;

Course Objectives:
At the end of the course the student should be prepared to:

1. Discuss the appropriate line weights, line types and line precedence as well as general rules for text height, proportion and placement.
2. Read and interpret multi-view drawings. Discuss the relationships between the various views of a multi-view drawing. Use and understanding of basic projection terminology.
3. Discuss and interpret inclined and oblique surfaces and the construction of auxiliary views.
4. Create and interpret isometric drawings including the construction of isometric arcs and circles.
5. Create and interpret sectional views: full, half, broken, revolved, removed, offset, rotated and partial.

6. Discuss and apply the mechanics of function based dimensioning for size and location of features including the proper placement of dimensioning and necessary annotation.
7. Discuss and apply reference points and datums for dimensioning.
8. Discuss and apply tolerances and tolerance accumulation.
9. Discuss and apply dimensioning of special features such as arcs, circles and slots.
10. Discuss and apply dimensioning to taper, chamfers fillets and angles.
11. Discuss and understand correct nomenclature for threaded parts and fasteners.
12. Discuss and apply dimensioning of threaded parts and fasteners including thread types, clearances, internal and external threads, thread classifications, countersinks and counterbores and clearances.
13. Discuss and apply the concepts of mating parts, fits and interchangeability.
14. Discuss, interpret and apply geometric dimensioning and tolerancing, (GD&T), including maximum material condition, (MMC), least material condition, (LMC), tolerance zones, control frames and GD&T symbols.

Course Outline:

- Sketching, lead, line weights, line types, title blocks, lettering
- Sketching circles and ellipses, proportions, using drawing tools
- Multiview projection, normal surfaces, missing views, line precedence, line
- intersections, isometric multiviews
- Circular features, fillets and rounds, runouts
- Orthographic inclined surfaces, choosing appropriate views
- Orthographic oblique surfaces
- Isometric sketching of normal surfaces
- Isometric sketching of arcs and circles
- Isometric sketching of inclined and oblique surfaces
- Full, half, broken, revolved, removed, and offset sections
- Rotated or aligned sections, partial views, intersections, and breaks
- Auxiliary views of inclined surfaces
- Auxiliary views of oblique surfaces, true line length, point view of a line, edge view
- of a plane, true surface size
- Mechanics of dimensioning, function based dimensioning, tolerances
- Size and location dimensions
- Assembly drawing, functional features of parts
- Tolerancing and dimensioning of mating parts, fits, reading tables on fits
- Unilateral, bilateral, limit dimensioning, tolerance accumulation

- Geometric dimensioning and tolerancing, MMC, LMC, RFS, tolerance zones
- Cost of tolerancing, tolerance considerations in manufacturing
- Threads—simplified, schematic, detailed; nomenclature, systems and applications
- Threaded fasteners—types and applications, standards of representation
- Springs—nomenclature, application, and standards

Suggested Laboratory Topics / Projects:
Each class period involves handouts for homework assignments for each of the topics listed in Section D above but the course includes no formal laboratory section