

Mechanical Drafting 2

Technology and Engineering

Grades 10 - 12, .5 Credits

Course Overview

Mechanical Drafting 2 is a continuation of Mechanical Drafting 1. Units covered include dimensioning, auxiliary views, section views, intersections and developments, assembly drawings, detail drawings, and one design project. Development of additional CAD drafting skills are emphasized. Students who satisfactorily complete this course may obtain dual credit at Fox Valley Technical College.

Scope and Sequence

Timeframe	Unit	Instructional Topics
Ongoing	Dimensioning	1. Baseline Dimensioning
2 Week(s)	Auxiliary Views	1. Primary Auxiliary Views
1 Week(s)	Intersections and Developments	1. Intersections and Developments
2 Week(s)	Assembly Drawings	1. Creative Woodshop Toy Project
2 Week(s)	Detail Drawings	1. Toy Drawings
2 Week(s)	Structural Design Problem	1. Guidelines
Ongoing	Literacy Integration	1. Terminology Review 2. Writing Applications

Prerequisites

Successful completion of Mechanical Drafting 1 with a grade above a "C" average is a requirement to enter this course.

Materials and Resources

Pencil
Folder
Instructor Packet

Course Details

UNIT: Dimensioning -- Ongoing

Description

The student will apply baseline dimensioning techniques.

Academic Vocabulary

Dimension Line, Extension Line, Leader, Center Line, True Size, True shape, Location.

Unit Level Key Questions

Why is it important to dimension a drawing?

Materials and Resources

Instructor Packet

TOPIC: Baseline Dimensioning -- 2 Day(s)

Description

Baseline Dimensioning technique is no different than using the Cartesian Coordinate method of plotting points from Math courses to find sizes or locations.

Learning Targets

Transfer cartesian coordinate graphing concepts into industry standards.

Math concepts such as Cartesian Coordinates need to be mastered in order to produce an item or run CNC equipment. Use math terminology and concepts within a drafting system while applying cartesian and polar coordinates

Sizes and locations are found on true size size, true shape surfaces.

UNIT: Auxiliary Views -- 2 Week(s)

Description

The student will apply primary auxiliary views.

Academic Vocabulary

Parrallel, Perpendicular, Elliptical

Unit Level Key Questions

How do I show the size and location of a hole or surface that is not on the X,Y,or Z axis?

Materials and Resources

Instructor packet.

TOPIC: Primary Auxiliary Views -- 3 Day(s)

Description

Primary Auxiliary Views are used to find the True Size and True Shape of surfaces or shapes that are otherwise foreshortened in normal Orthographic Views.

Learning Targets

Demonstrate the application of the primary auxiliary view process.

In order to dimension surfaces that do not appear as a true size or true shape in normal orthographic projection methods, it becomes necessary to revolve the troublesome surface.

UNIT: Intersections and Developments -- 1 Week(s)

Description

Using techniques and practices required for intersections and developments the student will draw and produce items out of paper.

Academic Vocabulary

Triangulation, French Curve, Spline, Stretch-out,

Unit Level Key Questions

How does the Packaging or the Heating and Ventilation industries create the drawings required in their specialities.

Materials and Resources

Drafting Textbook, sea green paper, instructor guidance.

TOPIC: Intersections and Developments [Ongoing]

Description

The ability to unfold a cardboard package so as to see how it was constructed is the best example of this units importance to industry. The student will learn how to use various drafting techniques to accomplish this task.

Learning Targets

Apply techniques of developments to design a part of an overall product.

A textbook will be used to assist the process.

UNIT: Assembly Drawings -- 2 Week(s)

Description

The student will design a toy that could be produced in the "Creative Woodshop" summer school course for elementary and middle school students.

Academic Vocabulary

Part Drawings, Assembly Drawings, Working Drawings, Specifications, Tolerancing, Common Parts, Lefts and Rights, Mirror Images.

Unit Level Key Questions

How does an idea go from thought to production?

Materials and Resources

Instructor notes, and department personel.

TOPIC: Creative Woodshop Toy Project -- 1 Day(s)

Description

Using past student designed and produced "Creative Woodshop" items, the student will design, draw, and prototype components of their toy.

Learning Targets

Design a toy that could be produced in the "Creative Woodshop" summer school course.

Use the Design Process to solve the problem.

- State the problem
- Collect ideas
- Choose 1 solution
- Test the solution
- Evaluate

UNIT: Detail Drawings -- 2 Week(s)

Description

The student will produce detailed drawings of the individual parts required for the toy of their design.

Academic Vocabulary

Checks, Inspections, Accuracy, Patience.

Unit Level Key Questions

How detailed is too detailed when it comes to dimensioning a drawing for production?

TOPIC: Toy Drawings -- 5 Day(s)

Description

Detailed drawings leave nothing to chance; there is no interpretation of what the drafter had in mind. The drawings created must be fool proof so that anyone can reproduce the actual part using either woodworking or metalworking tools and equipment.

Learning Targets

Produce detailed drawings of the individual parts required for the toy of their design.

Individual parts and assemblies are created and dimensioned.

UNIT: Structural Design Problem -- 2 Week(s)

Description

The student will design, draw, build, and test a structure. This structure may be a bridge or tower depending on instructor choice.

Academic Vocabulary

Stress, Strain, Balance, Strength, Flexibility, Rigid, Firm, Form, Function, Aesthetic, Functional, Structural.

Unit Level Key Questions

How do engineers determine what is acceptable when working with structures and materials.

Materials and Resources

1/8 x 1/8 x 12' balsa

white glue

TOPIC: Writing Applications [Ongoing]

Description

The written word is used in technical journals, assembly instructions, as well as in consumer information packets.

Learning Targets

Design, draw, build, and test a structure.

Given time and material constraints, the student will design, build and test a structure. This structure may be a bridge or tower depending on instructor choice.

UNIT: Literacy Integration -- Ongoing

Description

Students will define, review, and apply vocabulary in a variety of situations. Students will also have an opportunity to write for a variety of reasons.

TOPIC: Terminology Review -- 0 Day(s)

Description

Terminology and it's usage is important in getting operations, or procedures completed.

Learning Targets

Apply terminology from Mechanical Drafting I

Review Unit Content Vocabulary:

Counterbore, Countersink, Ream, Drill, Punch, Tap, Centerline, Center-mark, Bevel, Chamfer, Fillet, Rounds, Snap, Midpoint, Intersection, Tangent, Perpendicular, Parallel, Offset, Radius, Diameter, Trim, Erase, Extend, Move, Line, Mirror, Circle, Tangent-Tangent-Radius, 3 Point Circle, 2 Point Circle, Surfaces, Hidden Lines, Object Lines, Center Lines, Leader, Guide Line, Construction Line.

Define and apply new terminology.

New Unit Content Vocabulary:

Dimensioning, auxiliary view, section view, intersection and development, assembly drawing, detail drawing, baseline drawing, cartesian coordinate and polar coordinate.

TOPIC: Writing Applications [Ongoing]**Description**

The written word is used in technical journals, assembly instructions, as well as in consumer information packets.

Learning Targets

Produce writing pieces for a variety of purposes.

Written work may include; technical writing, research, reflections, and/or essays.