ATMT-1000: MECHANICAL & SPATIAL RELATIONS

Cuyahoga Community College

Viewing: ATMT-1000 : Mechanical & Spatial Relations

Board of Trustees:

September 2025

Academic Term:

Fall 2025

Subject Code

ATMT - Appd Ind Tech-ManufacturingTec

Course Number:

1000

Title:

Mechanical & Spatial Relations

Catalog Description:

Relationship between two-view and three-view images. Basics of visualizing three-dimensional objects from two-dimensional front, side, and top views. Perceptual ability, spatial views, matching parts and figures. Visualization of shapes or patterns that can result from fitting together cut-up pieces. Graphically describing size and shape to represent basic mechanical elements along with cube counting.

Credit Hour(s):

4

Lecture Hour(s):

4

Requisites

Prerequisite and Corequisite

Departmental Approval.

Outcomes

Course Outcome(s):

A. Develop the ability to visualize 3-dimensional objects from 2-D drawings for blueprint reading, job planning, set-up, and final machining of precision components.

Objective(s):

1. Recognize and name a given figure when pictured from a different angle.
2. Recognize and explain the practical use of tools as they are used with related parts.
3. Demonstrate mechanical insight by showing patterns that are in two or three views as they are related to a completed part view in mirror image, or rotated views.
4. Recognize and name a figure or part from a two dimension to a three dimension view.
5. Recognize and name a figure or part from a three dimension to a two-dimension view.
6. Demonstrate the concepts of relationships through graphical analysis and interpretation.
7. Describe the basic requirements of two views to three view dimensional figures.
8. Demonstrate perceptual ability of matching parts, and cube counting within special views by using a selection process.
9. Demonstrate understanding of visualizing a three-dimensional object by selecting matching and related objects.
10. Find a pattern in a given series of symbols by selecting matching and related objects.

Methods of Evaluation:

1. Classroom participation
2. Midterm exam
3. Final exam

Course Content Outline:

1. Symbol reasoning
   a. Comparison of symbols
   b. Views of interlocking symbols
   c. Methods in selection and choice
   d. Symbol relationships
2. Spatial views
   a. Definition of spatial views
   b. Selection of view integrity
   c. Rotated views
   d. Sequential special views
3. Tool knowledge
   a. Identifying tools
   b. Tool relationship
   c. Selection of tool practices
   d. Multi-use tools and their principal use
   e. Tool similarity
4. Mechanical insight
   a. Charts and diagrams
   b. Detailed mechanical review
   c. Mechanical series
   d. Mechanical Analysis
5. Matching parts
   a. Selection of matched parts
   b. Rotated parts
   c. 2-D versus 3-D
   d. 3-D versus 2-D
   e. Graphical analysis
   f. Graphical representation and solutions of 2-D and 3-D spatial problems
6. Figure turning
   a. Logical and analytical approaches
   b. Conventional methods
   c. Problem solutions
   d. Practical engineering drawing applications
7. Pattern analysis
   a. Logical and analytical approaches
   b. Graphical analysis
   c. Identifying patterns
   d. Comparison of patterns
8. Symbol series
   a. Solutions and evaluations
   b. Sequencing
   c. Rotation of symbols
   d. Selection processes and procedures
   e. Simplified symbols
9. Tool knowledge
   a. Practical tool use
   b. Tool selection processes
   c. Tool to fastener comparisons
   d. Gauging tools
10. Hidden figures
    a. Ability to find a simple geometric figure
    b. Figures within a larger, more complex feature

c. Features hidden within a figure
d. Geometric complex features
e. Isometric features

11. Cube counting
    a. Measuring and counting cubes
    b. Cube forms and relationships
    c. Quick count by mathematical formulation
    d. Pyramid, hollow form, hidden forms
    e. Simplex cube counting
    f. Inversion of cube form

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The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Resources for the Instructor

Baartmans and Sorby. *Introduction to 3D Spatial Visulization.* 1st. Delmar Cengage Learning, 2010.

Additional Resources for the Instructor

No Additional Resources.

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