

AIT-1040: SPATIAL AND MECHANICAL REASONING

Cuyahoga Community College

Viewing: AIT-1040 : Spatial and Mechanical Reasoning

Board of Trustees:

2013-11-29

Academic Term:

Fall 2024

Subject Code

AIT - Applied Industrial Technology

Course Number:

1040

Title:

Spatial and Mechanical Reasoning

Catalog Description:

Introduces the student to spatial development skills and mechanical reasoning. Included are practical applications of orthographic projections, figure conceptualization and cubic translation. Also covers mechanical analysis of pulley and gear systems and simple machines, including basic properties of physics.

Credit Hour(s):

1

Lecture Hour(s):

1

Requisites

Prerequisite and Corequisite

Eligibility for ENG-0985 Introduction to College Literacies, MATH-0915 Basic Arithmetic and Pre-Algebra or qualified Math placement, and concurrent enrollment in the following courses: AIT-1010 Construction Measurements and Calculations, AIT-1020 Comprehension and Communication for Construction, AIT-1030 Basic Construction Language, AIT-1050 Construction Industry Orientation, AIT-1060 Construction tools, and AIT-1120 Building Construction Trades Lab.

Outcomes

Course Outcome(s):

Develop spatial skills required for interpretation of orthographic projections, figure conceptualization and cubic translations.

Objective(s):

1. Visualize objects in perpendicular projections.
2. Develop creative design solutions to construction related problems.
3. Interpret construction drawings.
4. Identify critical installations shown as sections and details on blueprints.
5. Identify different symbols, conventions and abbreviations used on construction drawings.

Course Outcome(s):

Develop mechanical insight with respect to tools, gears, machines and pulleys.

Objective(s):

1. Discuss mechanical principles that enable correct tool selection for accomplishing job related tasks.
2. Analyze gear configurations to determine rotation and work output.
3. Interpret pulley and belt assemblies to determine rotational direction and mechanical advantage.
4. Assess job situations using levers and machines to perform work in efficient and safe operations.

Methods of Evaluation:

1. Quizzes
2. Tests
3. Class participation

Course Content Outline:

1. Spatial skills
 - a. Orthographic projection
 - i. Two dimensional
 - ii. Three dimensional
 - iii. Views
 1. Front
 2. Top
 3. Side
 4. North
 5. South East
 - iv. West
 - b. Design solutions
 - i. Figure conceptualization
 - ii. Cubic translations
 - iii. Drawing interpretation
 - c. Construction drawing analysis
 - i. Identify geographics
 - ii. Plans
 - iii. Sections
 - iv. Details
 - d. Critical information
 - i. Material
 - ii. Joinery
 - iii. Fabrication
 - e. Construction language
 - i. Symbols
 - ii. Conventions
 - iii. Abbreviations
2. Mechanical reasoning
 - a. Principles of physics
 - i. Levers
 - ii. Machines
 - iii. Pulleys
 - iv. Work
 - b. Gears
 - i. Configurations
 - ii. Rotation
 - iii. Revolutions
 - c. Belts and pulleys
 - i. Rotation
 - ii. Efficiency
 - iii. Advantage
 - d. Levers and machines
 - i. Work advantage
 - ii. Safety
 - iii. Lifting

Resources

Learning Express. *Mechanical and Spatial Aptitude*. 1st Edition. Learning Express New York, N.Y., 2001.

Sheryl Sorby. *Introduction to 3D Spatial Visualization*. Current Edition. Delmar Publishers Clifton Park, N.Y., 2003.

Jack Martin and Mary Serich. *Pre-Apprentice Training*. Current edition. Published by Jack Martin and Assoc Grand Blanc, Mi, 2006.

Resources Other

1. www.dleg.state.mi.us/bcsc/forms/cos/cosapr.pdf (<http://www.dleg.state.mi.us/bcsc/forms/cos/cosapr.pdf>) - Practical applicati
Apprenticeship Brochure - Text Version (<http://www.google.com/url/?q=http://www.ctdol.state.ct.us/progsupt/appren/t-AT18.htm&sa=U&ei=qFrBTqf0DKTi2QX4wdGkBQ&ved=0CCoQFjAl&usg=AFQjCNEXpeSiGq7G4YDbIZQq4IKdQuy1Fw>)
2. Feb 24, 2009 ... Training bullet CT Apprenticeship System bullet Veterans Information - Text
Version. "Earn While You Learn". Veterans, Eligible Dependents ...
3. www.ctdol.state.ct.us/progsupt/appren/t-AT18.htm (<http://www.ctdol.state.ct.us/progsupt/appren/t-AT18.htm>)
4. www.apprentice.degreeleap.com (<http://www.apprentice.degreeleap.com>)
5. nsapprenticeship.ca/...apprentices/technical_training.shtml
6. www.unionmillwright.com/app.html (<http://www.unionmillwright.com/app.html>) - Cached
(http://webcache.googleusercontent.com/search/?hl=en&rls=com.microsoft%3Aen-us%3AIE-SearchBox&rlz=117ADFA_enUS454&q=cache:qp6qi71fJPEJ:http://www.unionmillwright.com/app.html+apprenticeship+and+training+texts&ct=clnk) - Similar (http://www.google.com/search/?hl=en&rls=com.microsoft%3Aen-us%3AIE-SearchBox&rlz=117ADFA_enUS454&tbo=1&q=related:http://www.unionmillwright.com/app.html+apprenticeship+and+training+texts&sa=X)

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