

# MECHANICAL SCIENCE PRINCIPLES

**UNIT CODE:** ENG/CU/TXP/CC/03/5/A

## Relationship to Occupational Standards

This unit addresses the unit of competency: **Apply Mechanical science principles**

**Duration of Unit:** 85 hours

## Unit Description

This unit describes the competencies required by a Textile Processing craft person in order to apply a wide range of Mechanical science principles in their work. It includes using concepts of mechanical science, determining effects of loading on static and dynamic engineering systems, analyse properties of materials, determine parameters of a fluid system and use of basic systems in power transfer.

## Summary of Learning Outcomes

1. Use the concept of mechanical science
2. Determine effects of loading in static and dynamic engineering systems
3. Analyse properties of materials
4. Determine parameters of a fluid system
5. Use of basic mechanical systems in power transfer

## Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Use the concept of mechanical science	<ul style="list-style-type: none"><li>• Define work, force, mechanical advantage and efficiency</li><li>• State and explain newton's laws of motion</li><li>• Calculation velocity, distance, and acceleration</li><li>• Conversion and SI units of energy, power and work</li></ul>	<ul style="list-style-type: none"><li>• Written tests</li><li>• Oral questioning</li><li>• Assignments</li><li>• Supervised exercises</li></ul>
2. Determine effects of loading in static and dynamic	<ul style="list-style-type: none"><li>• Explain type of forces</li><li>• Discussion and analysis of reaction of forces</li></ul>	<ul style="list-style-type: none"><li>• Written tests</li><li>• Oral questioning</li><li>• Assignments</li><li>• Supervised exercises</li></ul>

engineering systems	<ul style="list-style-type: none"> <li>• Calculation of coefficient of friction and inclined plane</li> <li>• Resolve the forces</li> <li>• Calculate the resultant force and equilibrium</li> <li>• Discuss the application of different forces</li> <li>• Calculation of moments of a force,</li> </ul>	
3. Analyse properties of materials	<ul style="list-style-type: none"> <li>• Definition of mechanical properties of materials</li> <li>• Draw the stress strain graph</li> <li>• Discuss application of material depending on their properties</li> <li>• Discuss effect of environmental factors on material properties.</li> </ul>	<ul style="list-style-type: none"> <li>• Assignments</li> <li>• Oral questioning</li> <li>• Supervised exercises</li> <li>• Written tests</li> </ul>
4. Determine parameters of a fluid system	<ul style="list-style-type: none"> <li>• Discussion of Pascal's principles</li> <li>• Measuring fluid parameters</li> <li>• State the laws of gases</li> <li>• Discuss properties of water and steam</li> </ul>	<ul style="list-style-type: none"> <li>• Assignments</li> <li>• Oral questioning</li> <li>• Practical tests</li> <li>• Observation</li> <li>• Supervised exercises</li> <li>• Written tests</li> </ul>
5. Use of basic mechanical systems in power transfer	<ul style="list-style-type: none"> <li>• Uses and working principle of Gear trains</li> <li>• Uses and working principles of Pulley system, hoists and lifts</li> <li>• Uses and working principles of screws</li> </ul>	<ul style="list-style-type: none"> <li>• Assignments</li> <li>• Supervised exercises</li> <li>• Written tests</li> <li>• Practical test</li> </ul>

### Suggested Methods of Instruction

- Group discussions
- Demonstration by trainer
- Online video clips
- Power point presentation
- Exercises by trainee

### Recommended Resources

- Scientific Calculators
- Relevant reference materials

- Stationeries
- Electrical workshop
- Relevant practical materials
- Dice
- Computers with internet connection

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