Fundamentals of Roller Bearing

Code:2072-MECH

📝 Introduction

Roller bearings are crucial mechanical components designed to facilitate motion and minimize friction between rotating shafts and stationary parts. This course provides a comprehensive foundation in roller bearing technology, enabling learners to understand their construction, operation, and applications across various industries.

🔎 Description

This course explores the fundamental principles of roller bearings, covering their types, working mechanisms, materials, lubrication methods, failure modes, and practical considerations in design and maintenance. Emphasis is placed on both theoretical understanding and real-world application.

🎯 Objectives

- To develop a solid grasp of roller bearing principles and types.
- To analyze the function and selection criteria of roller bearings.
- To understand installation, maintenance, and troubleshooting methods.
- To examine common causes of failure and preventive strategies.

🗂️ Detailed Course Outline

1. **Introduction to Bearings**
    - Historical evolution
    - Classification of bearings
2. **Types of Roller Bearings**
    - Cylindrical, spherical, tapered, and needle roller bearings
    - Design features and use cases
3. **Principles of Operation**

- Load distribution
- Friction reduction mechanisms

4. **Materials and Manufacturing**
   - Bearing steels and alternatives
   - Quality control processes
5. **Lubrication Techniques**
   - Types of lubricants
   - Lubrication systems and regimes
6. **Failure Analysis**
   - Wear, fatigue, corrosion, and misalignment
   - Diagnostic tools and methodologies
7. **Selection and Sizing**
   - Load and speed calculations
   - Life expectancy assessment
8. **Installation & Maintenance**
   - Mounting/dismounting procedures
   - Inspection and condition monitoring

📚 What You Will Learn

- Classification and identification of roller bearings
- Operational principles and core functions
- Lubrication and maintenance best practices

- Failure modes and troubleshooting techniques
- Criteria for bearing selection and application

👥 Target Audience

- Mechanical engineering students
- Maintenance engineers and technicians
- Industry professionals in automotive, manufacturing, and energy sectors
- Technical trainers and educators

🛠️ Materials Provided

- Illustrated course handbook (PDF)
- Interactive 3D animations and schematics
- Real-world case studies
- Practice quizzes and assignments

👩‍🏫 Instruction Methods

- Instructor-led lectures and seminars
- Virtual lab demonstrations
- Group discussions and problem-solving sessions
- Hands-on exercises with bearing models

⏳ Time Frame

- Total duration: 16 hours (4 sessions, 4 hours each)

🏛️ Course Format

- Blended learning (on-campus and online options)

- Synchronous and asynchronous content
- Access to online resource platform

🎓 Learning Outcomes

Upon completion, participants will:

- Demonstrate understanding of roller bearing technologies
- Select appropriate bearing types for specific applications
- Diagnose and prevent bearing failures
- Implement maintenance procedures for optimal bearing performance