Wollo University

kombolcha institute of technology

Department of Industrial Engineering

Course Number: IEng 3150 **Course Title:** Maintenance Engineering and Management **Target group : 3rd year industrial engineering**	**Credit Hours:** 3 **Contact Hours:** 2 Lecture hrs and 3 tur. hrs

Course Objective

The course is intended to enable the student to:

- Understand theoretical and practical aspects of maintenance practice in industrial setup;
- Understand basics of damages of typical components of machinery and thereby help the student realize the state of damage of machinery;
- Realize the use of the concepts of reliability, maintainability and availability in maintenance technology which are helpful in the prediction of plant performance;
- Understand the organization of a maintenance department, maintenance planning and decision-making processes;
- Develop practical skill by providing some practical work of maintenance;

Course Description

Damages and their causes; Damages of typical machine components; Determination of the state of damage of equipment; Elements of maintenance technology; Maintenance Planning and Organization; Reliability, Maintainability and Availability; Spares Provisioning; Networking; Reconditioning Processes.

Course Outline:-

1. **Introduction**
   - 1.1 Definition of Maintenance
   - 1.2 Objectives of Maintenance
   - 1.3 Types of Maintenance
2. **Fundamental Theories of Damages**
   - 2.1 Fundamental Theories of Damages
   - 2.2 Typical Damages of Machine Parts
   - 2.3 Determination of the State of Damage /Failure
3. **Elements of Maintenance Technology**
   - 3.1 Accessibility
   - 3.2 Simplification
   - 3.3 Standardization and Interchange ability
   - 3.4 Modularization
   - 3.5 Identification and Labelling.....
4. **Decision Making**
   - 4.1 Economic Issues
   - 4.2 Legal Issues
   - 4.3 Maintenance Service Contracts (MSCs
   - 4.4 Information flows for MSC decision making
5. **Basic Probability Concepts and Reliability, Maintainability, and Availability**
   - 5.1 Rules for combining probabilities
   - 5.2 Probability Distribution Function
   - 5.3 Reliability, Maintainability, and Availability
6. **Maintenance Planning and Organization of Maintenance Planning**

6.1 Plant subdivision according to responsibility

7. **Spares Provisioning**
8. **Network Analysis for Planning and Control of Maintenance Work**
9. **Reconditioning Processes**

Pre-requisites: Plant Design

Co-requisites:

Textbook:
Teaching Material on "Maintenance of Machinery" prepared by Dr. AlemBazezew

References:

1. Gertsbakh, I.B., *Stastistical Reliability Theory*, Marcel Dekker, Inc., 1989.
2. Gopalakkrishinan, P., Banerji, A.K., *Maintenance and Spare Parts Management*, Prentice Hall of India Private Limited, New Delhi - 110001, 2002.
3. Halpern, S., *The Assurance Sciences, an Introduction to Quality Control and Reliability*, Prentice-Hall Inc., Englewood Cliffs, NJ, 1978.
4. Kececioglu, Dimitri, *Maintainability, Availability, and Operational Readiness*, Vol. I, Prentice - Hall PJR, Upper Saddle River, NJ, 1995.
5. Kelly, A., Harris, M.J., *Management of Industrial Maintenance*, Butterworths & C. (Publishers) Ltd., London, 1978.
6. Moubray, John, *Reliability - Centered Maintenance*, 2nd ed., Industrial Press Inc., NY, 1997.
7. Neale, M. J., *The Tribology Handbook*, 2nd ed., Butterworths - Heinmann Publishing Ltd., 1995.
8. Smith, Charles O., *Introduction to Reliability in Design*, McGraw - Hill Inc., 1976.

Method of Delivery:

- Lectures supported by tutorials
- Group project work
- Individual assignment
- Practical project work

Evaluation:

- Individual Assignment: 10 %
- Mid-semester Exam: 20 %
- Group Practical Project: 30%

Final Examination: 40 %

Attendance Requirement:

- Minimum of 75% attendance during lecture hours
- 100% attendance during practical work sessions, except for some unprecedented mishaps
- Presence during industrial visit session/sessions

Semester Hours:

48 lecture hours plus 48 tutor hours, a total of 96 hours