



## MASTER COURSE OUTLINE

Prepared By: Bill Autry

Date: May 2014

### COURSE TITLE

Introduction to Preventive/Predictive Maintenance

### GENERAL COURSE INFORMATION

Dept.: IST

Course Num: 120

(Formerly: )

CIP Code: 47.0303

Intent Code: 21

Program Code: 768

Credits: 3

Total Contact Hrs Per Qtr.: 44

Lecture Hrs: 22

Lab Hrs: 22

Other Hrs:

Distribution Designation:

### COURSE DESCRIPTION (as it will appear in the catalog)

Theory and practice of preventive and predictive maintenance concepts. Performing routine preventative maintenance and scheduling predictive maintenance outages.

### PREREQUISITES

IST 102 and MAP 103/MAP 117, or Instructor Permission

### TEXTBOOK GUIDELINES

Appropriate textbook as determined by faculty

### COURSE LEARNING OUTCOMES

*Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills.*

1. Students will be aware of the benefits and elements using reliability based maintenance techniques
2. Students will be able to demonstrate comprehensive understanding of the different types of maintenance practices
3. Students will be able to demonstrate and apply predictive maintenance technologies to maintenance procedures

### INSTITUTIONAL OUTCOMES

### COURSE CONTENT OUTLINE

- 1) Introduction to the Reliability Based Maintenance Concepts
  - a) Background information
  - b) Components of reliability based maintenance
  - c) Benefits
- 2) Details of Performing Different Maintenance Efforts
  - a) Run to failure maintenance
  - b) preventive maintenance
  - c) Predictive maintenance

- d) Proactive maintenance
- 3) Predictive Maintenance Technologies
  - a) Vibration analysis
  - b) Electrical testing
  - c) Temperature measurements
  - d) Oil analysis
  - e) Ultrasonic analysis
- 4) Elements of Vibration Analysis
  - a) Definitions
  - b) Transducers
  - c) Signal processing
  - d) Spectral defect characteristics
- 5) Vibration Analysis for Predictive Maintenance
  - a) Imbalance
  - b) Misalignment
  - c) Looseness
  - d) Rolling element bearings
  - e) Sleeve bearings
  - f) Gearboxes
- 6) Elements of Electrical Testing
  - a) Definitions
  - b) Insulation resistance testing
  - c) High-potential testing
  - d) Motor surge comparison tests
  - e) Harmonic testing
  - f) Spectral current analysis
  - g) Battery testing
- 7) Electrical Testing for Predictive Maintenance
  - a) Transformers
  - b) Switchgear
  - c) Motor control circuits
  - d) AC/DC motors
  - e) Transformers
- 8) Elements of Temperature Measurement
  - a) Definitions
  - b) Infrared
- 9) Temperature Testing for Predictive Maintenance
  - a) Steam traps
  - b) Switchgear
  - c) Transformers
  - d) Power and lighting panels
  - e) Motor control panels
- 10) Elements of Oil Analysis
  - a) Definitions
  - b) Viscosity testing
  - c) Additive and contaminant analysis

- 11) Oil Analysis for Predictive Maintenance
  - a) Gearboxes
  - b) Hydraulics
  - c) Engines
- 12) Elements of Ultrasonic Analysis
  - a) Definitions
  - b) Ultrasonic
- 13) Ultrasonic Analysis for Predictive Maintenance
  - a) Air systems
  - b) Rolling elements
  - c) Switchgear

**DEPARTMENTAL GUIDELINES** *(optional)*

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**DIVISION CHAIR APPROVAL**

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**DATE**