

SYLLABUS CURRICULUM

COURSE	Course Name : Maintenance Engineering and Management
	Course Code : TM184728
	Credit : 3 sks
	Semester : VII

COURSE DESCRIPTION

Equipment / machinery requires proper maintenance to maintain performance and avoid possible damage. The course of Engineering & Maintenance Management discusses the principles of maintenance techniques, methods and measuring tools used in the treatment of various equipment / machines. Learning includes lectures in the classroom and practicum.

With this course, students are expected to be able to use measuring instruments in condition monitoring and able to translate the measurement results to diagnose the damage of engine components. It is also capable of applying various methods in maintenance techniques to evaluate the reability, availability and diagnosis of equipment / machine damage.

LEARNING OUTCOMES

LO7	Understand and follow the most updated technology and the future of mechanical system, as well as its impacts to the economy, social and environment
LO9	Able to find the source of engineering problems in mechanical system through research that includes identification, formulation, analysis, data interpretation based on engineering principles.
LO10	Able to formulate the solution of engineering problem in mechanical system by considering economy, safety, environment and energy conservation.

COURSE LEARNING OUTCOMES

Students are able to explain principle and maintenance function (PM, PdM, RM) and classify equipments based on methods/ type of maintenance. Students are able to explain roles of measuring equipments used in condition monitoring (vibration, lubricant analysis, NDT) and possessing basic competence in operating measuring equipment and interpreting measurement result. Students are able to calculate practical and evaluate MBTF, reliability & availability of equipments and components. Students are able to explain and implement RCM method, TPM, RBI in maintenance. Students are able to explain and evaluate failure of equipment based on RCFA & FMEA, performance of maintenance based on KPI.

MAIN SUBJECT

The focus of this course are as follows:

- Purpose of Preventive, Predictive, Corrective Maintenance (PM, PdM, CM) and free maintenance
- Planning and scheduling.
- Measurement equipment in condition monitoring (vibration, lubricant analysis, NDT. Measurement principle and result interpretation.
- MBTF principles, reliability, availability and maintainability of equipment and component.
- Methods and implementation of RCM, TPM, RBI in industrial
- Equipment failure evaluation and components (RCFA & FMEA) of maintenance function equipment based on KPI and identify potential problem.
- Vibration diagnosis such as unbalance, misalignment, bearing fault diagnosis, gearmesh frequency, loosen component, crack shaft.
- Alignment and balancing method.
- Cathodic protection for stationary equipment.

PREREQUISITES

- Energy Conversion Machinery
- Mechanical Vibration

REFERENCE

1. Sullivan, GP., 2004, Operations & Maintenance Best Practices, Department of Energy (DOE).
2. Scheffer, C., 2004, Practical Machinery Vibration Analysis & Predictive Maintenance, Burlington, Elsevier.
3. Smith, AM., 2004, RCM: Gateway to World Class Maintenance, Elsevier.
4. --, 2000, RCM Guide for Facilities and Collateral Equipment, Washington, NASA.
5. Benbow, DW., 2009, The Certified Reliability Engineer Handbook, ASQ.
6. Bloch, H P., 2006, A practical Guide to Compressor Tech., John Wiley & Sons.
7. Hyatt, N., 2003, Guidelines for Process Hazards Analysis, Hazards Identification & Risk Analysis, CRC Press.
8. Karrassik, Igor J., 2006, Pump Handbook, McGraw-Hill.
9. Mitchell, JS., 1993, Intro. to Machinery Analysis and Monitoring, Pennwell book.
10. Newbold, D., 2005, A Practical Approach to Motor Vehicle Eng. and Mtce, Elsevier.