17MD017RELIABILITY ENGINEERING

GOURSE CODE	COURSE TITLE	L	P	T	C
17MD017	RELIABILITY ENGINEERING				

Course Description and Objectives:

ReliabilityisoneofthebiggestconcernswithalmostallphysicalSystemsusedin theindustry. This courseequipsthestudentswithalltheconceptsandtoolsthatarerequiredtoassess&Managerisk andplanforuninterruptedandhasslefreeoperationofindustrialsystems.

Course Outcomes:

Upon successful completion of this course student should be able to:

- convince others on the important of reliability with examples.
- show clear understanding of the terms and confusion commonly found in reliability.
- demonstrate the basic statistical knowledge needed and select them for analysis with strong convincing justification.
- make inference on the test results.
- explain the possible causes of poor reliability and suggest appropriate reliability tests and the associated failure analysis methods.

SKILLS ACQUIRED: Students are able to

- Calculate the reliability of a system
- Draw FTA for a system
- Analyze the risk involved in a system
- Understand the failure mechanism of a system.

UNIT-I

ReliabilityEngineering: Reliabilityfunction–failurerate–Meantimebetweenfailures(MTBF)–Meantimetofailure(MTTF)–Probabilityconcept-Additionalofprobabilities-complimentaryeventsusefullifeavailability–maintainability–systemeffectiveness.

UNIT-II

Reliability Data Analysis : Time tofailure distributions –Exponential, normal, Gamma, Weibull, rankingofdata–probabilityplottingtechniques–Hazardplotting.

UNIT-III

ReliabilityPredictionModels: SeriesandparallelSystems–RBDapproach–Standbysystems– m/nconfiguration–ApplicationofBaye'stheorem–cutandtiesetmethod–Markovanalysis– FTA– Limitations.

UNIT-IV

Reliability Management : Reliability Testing –Reliability growth monitoring –Non parametricmethods–Reliabilityandlifecyclecosts–Reliabilityallocation–Replacementmodel.

UNIT-V

Risk Assessment : Definiton and measurement risk –risk analysis techniques –risk reduction resources–industrialsafetyandriskassessment.

Activities:

1. Draw Fault tree Diagram for all machines in Design Lab.
2. Perform FMEA on each machine in Machine Design lab.

TextBooks:

1. JohnDavidson,"TheReliabilityofMechanicalSystem",2nd Edition,PublishedbytheInstitution ofMechanicalEngineers,London,1998.

2. E.BalaguruSwamy"ReliabilityEngineering"1st Edition,TataMc.GrawHill,NewDelhi,2003.

Reference Books:

1.Modarres,"ReliabilityandRiskanalysis",1st Edition,CRCPress,1992.

2. SmithC.O."IntroductiontoReliabilityinDesign",1st Edition,McGrawHill,London,1976.

3. CharlesE.Ebeling,"ReliabilityandMaintainabilityEngineering",2nd Edition,TataMcGrawHill,2009.