KL University
Department of Electronics & Computer Engineering
M.Tech (wcsn) 2015-2017

Course Code : 15-EM52H3
Course Title : Reliability Engineering Applications
Course Structure : 3-0-0
Credits : 3

SYLLABUS:

UNIT- 1

Concept of reliability: What is Reliability, System Reliability Parameters, Component Reliability, Reliability Function, and Failure Rate Failures: Causes of failures, types of failures, Modes of failure, Bath tub curve, Effect of preventive maintenance. Mathematics of reliability: Variation, Probability concept, Rules of probability, Continuous variation, Continuous distribution functions, Variation in engineering, Discrete variation, Statistical confidence, Statistical hypothesis testing, Non-parametric inferential methods, Goodness of fit Series of events, Computer software for statistics, Practical conclusions, Probability plotting

UNIT-2

Electronic System Reliability: Reliability of electronic Components, Component Types & Failure Mechanisms, Summary Of Device Failure Modes, Circuit & System Aspects, Electronic System reliability prediction, Reliability in electronic system design, Parameter variation and tolerance Design for production test and maintenance.

UNIT-3

Design for higher redundancy: Computer aided engineering, Environment, Design analysis methods Quality function deployment, Reliability prediction, Load strength analysis, Failure mode effect and criticality analysis, Fault tree analysis, Hazard and operability study, Parts material and process review System reliability models: Series, Parallel, Series-parallel, parallel-series, non- series-parallel configurations, Expressions for the reliability of the basic configurations, Reliability evaluation of Non-series-parallel configurations, Decomposition methods, Deduction of the minimal cut sets from the minimal path sets.
Quality: Managing production quality, Quality audit, Quality management approach.

UNIT-4

Maintainability: Maintenance time distribution, Preventive maintenance strategy, Maintenance schedule, Technology aspect, Calibration, Maintainability prediction, Design for maintainability Basic Safety Technology Principles for Processing Systems :Basic Requirements, Risk Definition and Analysis, Risk and Consequences of a Malfunction, Risk Assessment, Risk Graphs, Requirement Classes, Risk Acceptability, Standard Institutes and the role of Standards and Norms, Developing Safety Critical Computer Systems: General Concepts.

UNIT-5

Reliability Management: Corporate policy for reliability, integrated reliability programs, Standards for quality reliability and safety, contracting for reliability achievement, managing lower level supply, Customer management of reliability, Organization for reliability, reliability and cost, economics: Cost, Economics.

Text Books:

1. Practical Reliability Engineering -Patrick D. T. O' Connor., IV Edition
2. Electronic Safety Systems - Josef Borcsok