GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Semester: III

Power Electronics

Subject Name: **Reliability and Maintainability Engineering**
Subject Code: **732901**

Sr No.	Course Content	Hrs.
1	**Reliability Fundamentals:** Introduction, Its need, Causes of failure , types of failure, Catastrophic and degradation failure, Useful life of components, The exponential case of chance failures, reliability measures, Failure data analysis. Probability, random variables, Discrete and continuous distributions, stochastic processes, Markov chains. Probability distributions in reliability evolution.	8
2	**Reliability analysis of (a) series-parallel system:** - series, parallel, series-parallel system, K-out-of-M systems, open & short circuit failures stand by systems. (b) Non-series-parallel system: - Path determination, Boolean algebra methods, particular method, set approaches, delta-star, logical signal relations, Baye's theorem method etc.	6
3	**Reliability Prediction and allocation:** Classification, Requirements, Information sources for failure rate data, prediction methodologies, limitations, Subsystem reliability improvement, apportionment for new units, criticality.	6
4	**Maintainability & Availability:** - basics, forms of maintenance, Measures of maintainability & availability , Maintainability function, Availability function, two unit parallel system with repair, preventive maintenance, spares provisioning. Reliability Testing: - Types of testing, component reliability measurements, parametric methods, confidence limits, accelerated testing, equipment acceptance testing, reliability growth testing.	6
5	**Electronic system reliability:** Importance of Electronic system, various components used and their failure mechanisms, Reliability prediction of Electronics systems, part count method, part stress method, Sneak circuit analysis, physics of failure mechanisms of electronics components.	4

Reference Books:

1. K.K. Aggarwal 'Reliability Engineering', Kluwer Academic Pub.,
2. L.S.Srinath 'Reliability Engineering' Affiliated East –West press Ltd., New Delhi.
3. E.Balaguruswamy, 'Reliability Engineering', THM – New Delhi.
4. Lewis, Introduction to Reliability Engineering, Wiley International.