| Module No. | Unit No. | Topics | Hrs. |
|---|---|---|---|
| **1.0** | | **Probability Theory** | **08** |
| | **1.1** | Probability: Standard definitions and concepts; Conditional Probability, Baye's Theorem.<br>**Probability Distributions:** Central tendency and Dispersion; Binomial, Normal, Poisson, Weibull, Exponential, relations between them and their significance.<br>**Measures of Dispersion:** Mean, Median, Mode, Range, Mean Deviation, Standard Deviation, Variance, Skewness and Kurtosis. | |
| **2.0** | | | **08** |
| | **2.1** | **Reliability Concepts:** Reliability definitions, Importance of Reliability, Quality Assurance and Reliability, Bath Tub Curve.<br>**Failure Data Analysis:** Hazard rate, failure density, Failure Rate, Mean Time To Failure (MTTF), MTBF, Reliability Functions.<br>**Reliability Hazard Models:** Constant Failure Rate, Linearly increasing, Time Dependent Failure Rate, Weibull Model. Distribution functions and reliability analysis. | |
| **3.0** | | **System Reliability** | **05** |
| | **3.1** | System Configurations: Series, parallel, mixed configuration, k out of n structure, Complex systems. | |
| **4.0** | | **Reliability Improvement** | **08** |
| | **4.1** | Redundancy Techniques: Element redundancy, Unit redundancy, Standby redundancies. Markov analysis.<br>System Reliability Analysis – Enumeration method, Cut-set method, Success<br>Path method, Decomposition method. | |
| **5.0** | | **Maintainability and Availability** | **05** |
| | **5.1** | System downtime, Design for Maintainability: Maintenance requirements, Design methods: Fault Isolation and self-diagnostics, Parts standardization and Interchangeability, Modularization and Accessibility, Repair Vs Replacement.<br>Availability – qualitative aspects. | |
| **6.0** | | **Failure Mode, Effects and Criticality Analysis** | **05** |
| | **6.1** | Failure mode effects analysis, severity/criticality analysis, FMECA examples. Fault tree construction, basic symbols, development of functional reliability block diagram, Fau1t tree analysis and Event tree Analysis | |
| | | **Total** | **39** |

**References :**

1. L. S. Srinath, "Reliability Engineering", Affiliated East-Wast Press (P) Ltd., 1985.