M.TECH FIRST SEMESTER
POWER SYSTEM RELIABILITY

17EEPC1T5B **Credits: 4**
Lecture: 4 periods/week **Internal Assessment: 40 marks**
End Semester Assessment: 60 marks

Course Objective:
To emphasize the basic principles and advanced methodologies to evaluate the reliability of a large power system.

Course Learning Outcomes: At the end of the course the student will be able to

1. Understand the concept of generating system reliability.
2. Understand the concept of inter connected system reliability.
3. Understand the concept of operating reserve evaluation, composite generation and transmission systems reliability.
4. Understand the concept of distribution system reliability.

UNIT-I: GENERATING SYSTEM RELIABILITY
Generation system model, capacity outage probability tables, Recursive relation for capacity model building, unit removal, Evaluation of loss of load indices, Inclusion of scheduled outage, Load forecast uncertainty, loss of energy indices, Frequency and Duration methods, The generation model, System risk indices.

UNIT-II: INTER CONNECTED SYSTEM RELIABILITY
Probability array method in two interconnected systems, factors affecting the emergency assistance available through the interconnections, reliability evaluation in three interconnected systems, elementary concepts for reliability evaluation of multi-connected systems.

UNIT-III: OPERATING RESERVE EVALUATION
Basic concepts, PJM methods, security function approach, Response risk.

Composite Generation and Transmission Systems Reliability: Radial configurations, conditional probability approach, network configurations, state selection, system and load point indices, Data requirements for composite system reliability evaluation

UNIT-IV: DISTRIBUTION SYSTEM RELIABILITY
Basic technique and application to radial systems, customer-oriented indices, load and energy indices, effect of lateral distributor protection, effect of disconnects effect of protection failures, effect of load transfer, meshed and parallel networks, approximate methods, failure modes and effects analysis, inclusion of scheduled maintenance, temporary and transient failures, inclusion of weather effects.

TEXT BOOK:

Reliability Evaluation of Power Systems – Roy Billinton and Ronald N. Allan, Plenum press, New York (Second Edition), 1996.

REFERENCE BOOK:

Reliability Evaluation of Engineering Systems – R. Billinton, R.N.Allan, Pitman Publishing Limited.