Course Name Advanced Power System

Course Code EE703A

Course Credit 3

Contact Hour 3L

Prerequisite Power System I & II (EE502 & EE602)

Course Objective

The objectives of this course are

1. To produce electrical Power Systems graduates, who are employable in public and private industries/ Institutes/Organization, or pursue higher education.
2. To prepare graduates who have the ability to identify and address current and future problems in the domain of power systems, power electronics and electrical machines.
3. To inculcate research attitude and lifelong learning among graduates.

Course Outcomes (COs)

On completion of the course students will be able to

1. Acquire in-depth advance knowledge in the domain of modern and industrial oriental power systems.
2. Critically analyze various power systems components, models and their operation, optimization of cost criteria.
3. Fundamentals and concepts to analyze, formulate and solve complex problems of electrical power systems and its components and control of frequency and voltages.
4. Use advanced techniques, skills and modern scientific and engineering tools for professional practice for power system to enhanced power quality, reliability, security and load ability.

CO Mapping with departmental POs

H: High, M: Medium, L: Low

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	H	H	H	H	M							
CO 2	M	H		H	H							
CO 3	H	H	L	H	H							
CO 4	H	L		H	H							

Course Content

Module I: Objectives of Power System Operation **6L**

Power Systems in Restructured Environment; Distributed and Dispersed Generation; Environment Aspects of Electric Power Generation.

Module II: Economic Operation of Energy Generation Systems **10L**

Generation Cost Curves; Economic Operation of Thermal System; Plant Scheduling; Transmission Loss and Penalty Factor; Hydro-Thermal Scheduling; Concept of Reserves and Constraints; Unit Commitment.

Module III: Automatic Generation Control **8L**

Concept of AVR and ALFC Loops, Significance of Double Loop in ALFC; Exciter and VAR Control; Single Area Load Frequency Control; Two Area Load Frequency Control; Frequency Response.

Module IV: Compensation in Power System **8L**

Reactive Power Sensitivity and Voltage Control; Load Compensation with Capacitor Banks; Line Compensation with Reactors; Shunt and Series Compensation; Fixed Series Capacitors; Thyristor Controlled Series Capacitors; Introduction to SVC and STATCOM.

Module V: Power System Transients **8L**

Types of System Transients; Overvoltage in Transmission Lines; Propagation of Surges and Travelling Waves; Protection Against Lightning and Surges;

Text Books:

1. Power System Engineering, Kothari & Nagrath, Mc Graw Hill
2. Power System Analysis, Granger and Stevension, Mc Graw Hill
3. Electric Power Genration operation and control, Wood and Woolenberg, Willey.

Reference Books:

1. Power system stability and Control, P. Kundur , Mc Graw Hill
2. Modern power system analysis, Kothari & Nagrath, Mc.Graw Hill
3. Power system Analysis, Nagsarkar & Sukhija, Pearson
4. Power system analysis, operation and control, Chakrabarti and Halder, PHI Book of Elgand.