ADVANCED POWER SYSTEM ANALYSIS

1. **Review of transmission Line (5 hours)**
   1. Basic relationship in transmission line
   2. Uncompensated line
   3. Load compensation and System compensation
   4. Symmetrical line and mid point voltage of Symmetrical line

1. **Conventional method of transmission line compensation (8 hours)**
   1. Shunt compensation
   2. Series compensation
   3. Phase angle control
   4. Effects of compensations on voltage regulation, transient stability and voltage stability

1. **Compensation Using Power electronic Devices (20 hours)**
   1. Thyristor Controlled Reactor (TCR)
   2. Thyristor Switched Capacity (TSC)
   3. fixed Capacitor Thyristor Controlled Reactor
   4. Switfhing Converter type Var generator (STATCOM)
   5. GTO Controlled Series Capacitor (GCSC)
   6. Static Synchronous Series Capacitor (SSSC)
   7. Unified Power Flow Controller (UPFC)
   8. Static voltage and phase angle controller

1. **Computer Simulation Study (12 hours)**
   1. Study on TCR, Fixed Capacitor Thyristor Controlled Reactor, STATCOM
   2. Modeling of synchronous machine in d‐g‐0 frame
   3. Use of Mat‐Lab Simulink in power system analysis
   4. Load flow analysis – Gauss Siedal method, Newton‐Raphson method and Fast‐Decoupled method.
   5. Rotor Angle Stability
   6. Voltage Stability

**Practical:**  
Exercised on computer simulation

**References:**

1. Jhon J. Grainger and William D. Stevenson Jr., "Power system Analysis", Mc Graw Hill.
2. Narain G. Higorani and Laszlo Gyugai, Understanding FACTS", IEEE Press
3. Hadi Saadat, "Power System analysis", TATA Mc Graw Hill.
4. R.H. Miller, "Reactive power compensation in power system", Mc. Graw Hill
5. P.S. Kundur, "Power System Stability and control", Mc. Graw Hill. Inc.