**EEE-318: Power System II**

**Even Semester, 2017-18**

**INSTRUCTIONAL PLAN**

**L T P: 3-1-0 Credits: 4**

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| **Lecture No.** | **Topic(s)** | **Reference and Chapter** |
| **Unit 1 : Review of Basic Concepts (4)** | | |
| 1 | Representation of synchronous machine and transformer in power system | Ref. 1  Chapter 2 |
| 2 | Single line diagram, Impedance and Reactance Diagram |
| 3-4 | Per-unit system and its significance, change of base |
| **Unit 2 : Power Flow Analysis (11)** | | |
| 5-6 | Formation of bus admittance matrix (YBUS) using inspection method and singular transformation method, Modification of YBUS | Ref. 3  Chapter 8 |
| 7 | Bus classifications, Solution of non-linear algebraic equations |
| 8 | Solutions of load flow equations using Gauss Seidel method excluding PV buses |
| 9 | Solutions of load flow equations using Gauss Seidel method including PV buses |
| 10 | Newton-Raphson method to solve non-linear equations |
| 11-12 | Solutions of load flow equations using Newton-Raphson method excluding PV buses |
| 13 | Solutions of load flow equations using Newton-Raphson method including PV buses |
| 14 | Solutions of load flow equations using fast decoupled method. |
| 15 | comparison of the three methods |  |
| **Unit 3 : Fault Analysis (5)** | | |
| 16 | Balanced three phase faults, Short circuit capacity | Ref. 1,  Chapter 4 |
| 17 | Symmetrical components of unsymmetrical phasors |
| 18 | Sequence impedances, Sequence networks |
| 19-20 | L-G, L-L and L-L-G faults |
| **Unit 4 : Power System Stability (6)** | | |
| 21 | Basic concepts and definitions, Classification of stability; rotor angle stability and voltage stability, Steady-state stability, dynamic stability and transient stability | Ref. 1,  Chapter 8 and Chapter 11 |
| 22-23 | Rotor dynamics and swing equation |
| 24-25 | Equal area criteria, Response to a short circuit fault |
| 26 | Factors influencing steady-state and transient stability | Ref. 3  Chapter 2 and Chapter 3 |
| 27-28 | Numerical integration methods for transient stability evaluation, Euler method, modified Euler method and Runge-Kutta methods |
| **Unit 5 : Power System Control and FACTS (5)** | | |
| 31-32 | Concept `of load frequency control | Ref. 2 |
| 33-34 | Methods of voltage control |
| 35 | Concept of reactive power control |
| 36 | Introduction to FACTS |

**Reference Books and Monographs**

1. Grainer J.J. and Stevenson W.D., ‘Power System Analysis’ McGraw Hill, 1994.
2. Kothari D.P. and Nagrath I.J., ‘Modern Power System Analysis’ Tata McGraw Hill Publishing Company Limited, 2003.
3. H. Saadat, ‘Power System Analysis’ McGraw Hill, 1999.