**Lesson Plan**

Name of faculty : Er. Puneet Chawla

Discipline : Electrical Engineering

Semester : 8th

Subject : Computer Methods in Power System (ET-402E)

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | Theory | | **Date of Actual covered** | **Signatures** | | | | | |
| Lecture  Day | Topic (Including assignment / Test) | **Concerned teacher** | | | **HOD** | **DP** | |
| **Unit-I** | | | | | | | | | |
| 1st | 1 | Introduction to CMPS |  | |  |  | | |  |
| 2 | General : Impact of computers |
| 3 | Orientation of engineering problems to computers |
| 4 | Review of matrices and matrix operations |
| 2nd | 5 | Incidence and Network Matrices: Network graph |  | |  |  | | |  |
| 6 | Various incidence matrices |
| 7 | Numerical problems |
| 8 | Generalized element representation |
| 3rd | 9 | Primitive network and primitive network matrices |  | |  |  | | |  |
| 10 | Formation of various network matrices by singular transformations |
| 11 | Inter-relations between various incidence matrices and network matrices |
| 12 | Numerical problems |
| **Unit-II** | | | | | | | | | |
| 4th | 13 | Bus Impedance matrix: Building algorithm for bus impedance matrix |  | |  |  | | |  |
| 14 | Modification of bus impedance matrix for change of reference bus and for network changes |
| 15 | Formation of bus admittance matrix and modification |
| 16 | Numerical problems |
| 5th | 17 | Calculation of Z bus elements for Y Bus |  | |  |  | | |  |
| 18 | Three-phase Elements: Representation of three-phase network elements |
| 19 | 1st Assignment |
| 20 | Treatment under balanced excitation |
| 6th | 21 | Treatment under unbalanced excitation |  | |  |  | | |  |
| 22 | Transformation matrices |
| 23 | Numerical problems |
| 24 | Unbalanced elements |
| **7th** | **1st Minor Test** | | | | | | | | |
| **Unit-III** | | | | | | | | | |
| 8th | 25 | Short-Circuit Studies **:** Introduction |  | |  |  | | |  |
| 26 | Network short-circuit studies using Z bus |
| 27 | Short-circuit calculations using symmetrical components for various types of faults |
| 28 | Load-Flow Studies **:** Introduction |
| 9th | 29 | Importance of load flow studies |  | |  |  | | |  |
| 30 | Classification of buses, Load-flow equations |
| 31 | Iterative methods: Computer algorithm and load flow solutions using Gauss Seidel method |
| 32 | Computer algorithm and load flow solutions using Newton-Raphson method |
| 10th | 33 | Decoupled and fast decoupled load-flow solutions |  | |  |  | | |  |
| 34 | Representation of regulating and off-nominal ratio transformers |
| 35 | Comparison of load-flow solution methods |
| 36 | Numerical problems |
| **Unit-IV** | | | | | | | | | |
| 11th | 37 | Sparsity: Introduction |  | |  |  | | |  |
| 38 | Optimally ordered triangular factorization |
| 39 | Schemes of optimal ordering |
| 40 | Numerical problems |
| 12th | 41 | Stability Studies: Introduction |  | |  |  | | |  |
| 42 | Algorithmic flow chart |
| 43 | Transient stability solution using Modified Euler method |
| 44 | 2nd Assignment |
| 13th | 45 | Numerical problems |  | |  |  | | |  |
| 46 |  |
| 47 | Power System Security: Introduction |
| 48 | Contingency analysis using Z Bus and various distribution factors |
| **14th** | **2nd Minor test** | | | | | | | | |
| 15th | 49 | Revision |  | |  |  | | |  |
|  | 50 | Revision |
|  | 51 | Old university papers discussions |
|  | 52 | Old university papers discussions |