



COMPUTER AIDED POWER SYSTEM ANALYSIS

PROF. BISWARUP DAS

Department of Electrical Engineering
IIT Roorkee

TYPE OF COURSE : Rerun | Elective | UG/PG**COURSE DURATION** : 12 weeks (26 Jul' 21 15 9 Oct' 21)**EXAM DATE** : 15 Oct 2021

PRE-REQUISITES : Course on 'Power System Engineering', which is generally offered in 2nd year/third year of B.Tech program.

INTENDED AUDIENCE : B.Tech fourth year/M.Tech

INDUSTRIES APPLICABLE TO : PGCIL, NHPC, all state power transmission companies

COURSE OUTLINE :

This course introduces the computational aspects of the power system analysis. The thrust of this course is description of the computer algorithms for analysis of any general power transmission system. Starting with load flow analysis, which is essentially the backbone of any power system analysis tool, this course further deals with computer algorithms for contingency analysis, state estimation and phase domain fault analysis method of any general power transmission system.

ABOUT INSTRUCTOR :

Dr. Biswarup Das has obtained his Ph.D from IIT Kanpur. He is presently a Professor with the Electrical Engineering Department, Indian Institute of Technology, Roorkee, India. His general area of teaching and research is electrical power system.

COURSE PLAN :

- Week 1:** Review of modeling of power system components and formulation of YBUS matrix
- Week 2:** Basic power flow equations and Gauss-Seidel load flow method
- Week 3:** Newton-Raphson load flow in polar co-ordinate
- Week 4:** Newton-Raphson load flow in rectangular co-ordinate and introduction to Fast Decoupled load flow method
- Week 5:** Fast Decoupled load flow method and AC-DC load flow method
- Week 6:** Sparsity and optimal ordering methods
- Week 7:** LU decomposition and contingency analysis
- Week 8:** Line outage sensitivity factor and method of least square
- Week 9:** Method of least square (contd..) and Introduction to AC state estimation
- Week 10:** AC state estimation (contd..) and test for bad data detection
- Week 11:** Formulation of YBUS matrix of three phase unbalanced system
- Week 12:** Fault analysis in phase domain