



The
University
Of
Sheffield.

Electronic &
Electrical
Engineering.

EEE301 POWER SYSTEMS ENGINEERING

Credits: 10

Course Description including Aims

1. To develop and demonstrate the use of system models for unsymmetrical fault analysis and load flow studies.
2. To study the dynamic stability of power systems.
3. To study power system components, and basic techniques for power system protection.

Outline Syllabus

Fault analysis: symmetrical components, sequence impedances and voltage drops, positive, negative and zero sequence circuits and networks, asymmetrical faults on power systems. **Protection:** measurement of symmetrical components for protection, differential protection.

Transmission/distribution system parameters: overhead lines, resistance, inductance, capacitance, underground cable, capacitance. **Power flow control, Power System Stability:** steady-state and dynamic stability, swing equation, critical fault clearance time. Load flow analysis: direct and iterative methods.

Time Allocation

24 lectures plus 12 hours of additional support material.

Recommended Previous Courses

EEE102 "Power Networks", EEE202 "Electromechanical Energy Conversion", EEE220 "Electric and Magnetic Fields", EEE341 "Electrical Power Systems"

Assessment

2 Hour Examination.

Recommended Books

Grainger J.J. & Stevenson W.D.	Power Systems Analysis	McGraw-Hill
Guile, A.E.	Electric Power Systems (vol. I & II)	Oliver and Boyd
Waddicor, H	Principles of Electrical Power Transmission	Chapman and Hall
Weedy, B.M	Electric Power Systems (3rd ed.)	Wiley

Objectives

By the end of the unit a successful student will be able to

1. analyse normal and abnormal conditions of operation of power systems.
2. calculate transmission line parameters for use in load flow, fault current magnitude estimation and power system stability analyses.
3. describe the operation of power systems.
4. demonstrate knowledge of time and current graded protection methods and equipment.
5. show awareness of the issues involved with embedded power generation