Liverpool John Moores University

Title:	POWER SYSTEM ANALYSIS
Status:	Definitive
Code:	**5508ICBTEL** (127026)
Version Start Date:	01-08-2021
Owning School/Faculty:	Engineering
Teaching School/Faculty:	ICBT, Colombo

Team	Leader
Alison Cotgrave	Y

Academic Level:	FHEQ5	**Credit Value:**	15	**Total Delivered Hours:**	63
Total Learning Hours:	150	**Private Study:**	87		

Delivery Options
Course typically offered: Semester 1 and Summer

Component	Contact Hours
Lecture	45
Off Site	6
Tutorial	9

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Exam	70	3
Report	AS2	Coursework (1500 words)	30	

Aims

This module introduces the student to fundamentals of an Electrical power system. Moreover, the student is introduced to three phase symmetrical/unsymmetrical faults, and analysing/solving power quality and harmonic problems.

Learning Outcomes

After completing the module the student should be able to:

1 Summaries basic power generation along with per unit values in an electrical power system and describe the single line representation of the power system.
2 Analyze a three phase power systems and transmission line parameters.
3 Solve power flow calculations
4 Analyze three phase symmetrical/unsymmetrical fault and apply power quality and harmonic problems

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Exam	3	4	2
Coursework	1		

Outline Syllabus

Introduction and Basic concepts
Power System Representation/ Power Generation
Single Line Diagram
Per Unit System for single phase circuits
Per Unit System for three phase circuits

Transmission Lines
Transmission Line Representation
AC vs. DC transmission
Standard Transmission Voltages
Series Impedance Calculation : Resistance, Inductances and Capacitances
Short, Medium and Long line models; A,B,C,D constants
Efficiency and Voltage regulations
Series and Shunt Compensations

Power Flow
Power Flow Calculations
Review of Real, Reactive and Apparent Power
Gauss-Seidel Load Flow Method
Newton-Raphson Load Flow Method
Decoupled Load Flow Method
Contingency calculations
DC Load Flow

Three Phase Systems
Three Phase Fault Calculations
Symmetrical fault
Symmetrical components
Positive, Negative and Zero sequence equivalent circuits
Unsymmetrical Faults : L-G, L-L-G, L-L faults

Circuit Breaker ratings.

Learning Activities

Students will be supported in their learning, to achieve the above learning outcomes, in the following ways:

By a series of lectures and tutorials and through participation within practical sessions for problem solving.

Notes

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