



GOKUL GLOBAL UNIVERSITY

FACULTY OF ENGINEERING

PHD PROGRAM

COURSE WORK SYLLABUS

ELECTRICAL ENGINEERING

Electrical Network:

Basic Laws, Network Theorems, Nodal & Mesh Analysis, Laplace transform. Fourier Transform, Two Port and Multi port network. Basics of Z, Y & H parameters.

Electrical Machines & Power Electronics:

Basic principle of motor and Generators, Various types, Starting methods of motors, Input and Output characteristics of DC Machines and its applications., Input and Output characteristics of 1-phase and 3-phase AC asynchronous Machines and its applications. Types of transformers, Working, Testing and Parallel operations of transformer, Special transformers (Auto, CT, PT). Basic principle, Various types, Starting methods, Input and Output characteristics of 3-phase Synchronous Machines and its applications. Power Electronics devices, Controlled rectifiers, Uninterrupted power supplies, Various inverters, Choppers, Line commutated converters, Multi-level Inverters, Electrical drives, Electrical traction, Heating and Welding, Illumination.

Measurement & Instrumentation:

Various DC and AC bridges, Potentiometers, Moving Coil and Moving iron meters, digital meters, various types of Transducers to measure physical quantities.

Control System Theory: Open loop and Closed loop system, advanced control system, Adaptive control.

Microprocessor & Microcontroller with all interfacing device:

I/O device, semiconductor memories

Power System Analysis, Operation and Control:

Power System Modeling, Fault analysis, Load flow Analysis, Stability of single and multi-machine systems, Automatic Generation control, Economic operation, State Estimation, Power System Security. Various software to simulate power systems. Low voltage constraint and resolving, Performance of line fault analysis, Measurement of Electrical Power, Functions of capacitors and reactors, Distribution Network Installation, Analysis of Distribution transformers, Meters and Testing.

Switch gear and Protections:

Isolators, Arc quenching methods, various types of Circuit breakers, Testing of Circuit Breakers, design of sub stations and transmission lines, various types of Cables. Types of relays, Restricting Voltage and Recovery Voltage., Impedance relay, Directional relay, Reactance relay, Mho relay, Transmission line protection, Generator Prot., Bus-zone port.



Recent trends in Power System:

HVDC systems, FACTS Controllers, Distributed Generation, Smart Grids, Integration of Renewable power plants, Topics from research papers published in last 5 years.

NOTES: Some basic topics from Electrical, Analog Electronics, Digital Electronics and control system is not included but indirectly covered in advance topics of Electrical Engineering. Energy Storage devices, Electrical Vehicle and EV charging stations, AI system, Mini grid, Micro grid, Super Capacitors, Ultra capacitors.

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