Syllabus for B.Tech[MAKAUT]
Department of Electrical Engineering

POWER SYSTEM-II

EE-602

Credit: 4 **Contact: 3L+1T**

MODULE	CONTENT	HOUR
1	**Representation of Power system components:** Single-phase representation of balanced three phase networks, the one-line diagram and the impedance or reactance diagram, per unit (PU) system	02
2	**Distribution substation:** Types of substations, location of substations, substation equipments and accessories, earthling (system & equipment), feeder and distributors, radial and loop systems.	06
3	**Load flow studies:** Network model formulation, formation of Ybus , load flow problem, Gauss-Siedel method, Newton-Raphson method, Decoupled load flow studies, comparison of load flow methods.	08
4	**Faults in Electrical systems:** Transient on a transmission line, short circuit of a synchronous machine under no load &loaded condition. Symmetrical component transformation, sequence impedance and sequence network of power system, synchronous machine, transmission lines and transformers. Symmetrical component analysis of unsymmetrical faults, single line-to –ground fault, line to- line fault, double line-to- ground fault.	08
5	**Power system stability:** Steady state stability, transient stability, equal area criteria, swing equation, multi machine stability concept	04
6	**Power system protection:** Protective zones, Relaying elements and quantities. Protective relays, basic requirements and type of protection, phase and amplitude comparator, grading (time & current), classification of Electromagnetic relays, Directional relay, Distant relay, Differential relay, basic aspects of static and digital relays, relay protection scheme for transformer, feeder, generators and motors. Circuit breakers, circuit breaking transients, transient recovery voltage, current chopping and resistance switching, circuit breaker rating, arc and arc extinction, circuit breaker types, oil circuit breaker, vacuum circuit breaker, air blast circuit breaker, SF6 circuit breaker and operating mechanism, advantages and disadvantages of different types.	16

Text Books:

1. Modern Power System Analysis, D.P. Kothari & I.J. Nagrath, 4th Edition, Tata McGraw Hill.
2. Electrical Power Systems, Subir Ray, PHI
3. Switchgear protection and power systems, Sunil S Rao, Khanna Publications.
4. A text book on Power System Engineering, M.L.Soni, P.V.Gupta, U.S. Bhatnagar & A. Chakrabarti, Dhanpat Rai & CO.

Netaji Subhash Engineering College
Department of Electrical Engineering

3RD YEAR/6TH SEM/EE/2020(EVEN SEMESTER)

POWER SYSTEM-II (EE 602)

Lesson plan

NAME OF FACULTIES: ***SATHYAPRABAKARAN& DEBLINA MAITY***

CLASS	CONTENT	HOURS	MODE OF TEACHING
DAY1	**Representation of Power system components:** Single-phase representation of balanced three phase networks, the one-line diagram	2	Board
DAY2	The impedance or reactance diagram, per unit (PU) system and numerical solving	2	Board
DAY3	**Distribution substation:** Types of substations, location of substations	2	PPT/ Board
DAY4	Substation equipments and accessories, earthling (system & equipment)	2	PPT/ Board
DAY5	Feeder and distributors, radial and loop systems. Numerical solving	2	PPT/ Board
DAY 6	**Load flow studies:** Network model formulation, formation of Ybus	2	PPT/ Board
DAY 7	load flow problem, Gauss-Siedel method,	2	PPT/ Board
DAY 8	Newton-Raphson method, Decoupled load flow studies,	2	PPT/ Board
DAY9	comparison of load flow methods+ more numerical	2	PPT/ Board
DAY10	**Faults in Electrical systems:** Transient on a transmission line, short circuit of a synchronous machine under no load &loaded condition.	2	PPT/ Board
DAY11	Symmetrical component transformation, sequence impedance and sequence network of power system, synchronous machine, transmission lines and transformers+ numericals	2	PPT/ Board
DAY12	Symmetrical component analysis of unsymmetrical faults, single line-to –ground fault+ numericals	2	PPT/ Board
DAY13	line to- line fault, double line-to- ground fault.+numericals	2	PPT/ Board
DAY14	**Power system stability:** Steady state stability, transient stability	2	PPT/ Board
DAY15	equal area criteria, swing equation, multi machine stability concept	2	PPT/ Board
DAY16	Numerical solving in the chapter stability	2	PPT/ Board
DAY17	**Power system protection:** Protective zones, Relaying elements and quantities. Protective relays, basic requirements and type of protection, phase and amplitude comparator, grading (time & current),	2	PPT/ Board
DAY18	classification of Electromagnetic relays, Directional relay, Distant relay	2	PPT/ Board

DAY19	Differential relay, basic aspects of static and digital relays	2	PPT/ Board
DAY20	Relay protection scheme for transformer, feeder, generators and motors.	2	PPT/ Board
DAY21	Circuit breakers, circuit breaking transients, transient recovery voltage, current chopping and resistance switching	2	PPT/ Board
DAY22	circuit breaker rating, arc and arc extinction, circuit breaker types, oil circuit breaker	2	PPT/ Board
DAY23	Vacuum circuit breaker, air blast circuit breaker, SF6 circuit breaker and operating mechanism, advantages and disadvantages of different types.	2	PPT/ Board

COURSE OUTCOME [CO]

EE602.1	Student able to **calculate** the quantities in per unit values and **represent** the Power system components in single line diagram and
EE602.2	Student able to Know about the **Constructing** of various electric distribution substation and substation equipments
EE602.3	Student able to apply appropriate technique for load flow analysis and its **Comparing**
EE602.4	Student able to get knowledge about faults **detecting** in power systems
EE602.5	Student able to **Study** the power system stability concepts
EE602.6	Student able to do **Experiment** in various protection of generator ,feeder and transmission line using relays and circuit breakers