B.P. PODDAR INSTITUTE OF MANAGEMENT AND TECHNOLOGY
Department of Electrical Engineering
Syllabus of Power System-I

EE-502

Credit: 4
Contact: 3L+1T

Module	Content	Hour
1	**Overhead transmission line:** Choice of frequency, Choice of voltage, Types of conductors,Inductance and Capacitance of a single phase and three phase symmetrical and unsymmetrical configurations. Bundle conductors. Transposition. Concept of GMD and GMR. Influence of earth on conductor capacitance. **Overhead line construction:** Line supports, Towers, Poles, Sag, Tension and Clearance, Effect of Wind and Ice on Sag. Dampers.	12
2	**Insulators:** Types, Voltage distribution across a suspension insulator string, String efficiency, Arching shield & rings, Methods of improving voltage distribution across Insulator strings, Electrical tests on line Insulators. **Corona:** Principle of Corona formation, Critical disruptive voltage, Visual critical corona discharge potential, Corona loss, advantages & disadvantages of Corona. Methods of reduction of Corona. **Cables:** Types of cables, cable components, capacitance of single core & 3 core cables, dielectric stress, optimum cable thickness, grading, dielectric loss and loss angle.	10
3	**Performance of lines:** Short, medium (nominal , T) and long lines and their representation. A.B.C.D constants, Voltage regulation, Ferranti effect, Power equations and line compensation, Power Circle diagrams.	8
4	**Generation of Electric Power:** General layout of a typical coal fired power station, Hydro electric power station, Nuclear power station, their components and working principles, comparison of different methods of power generation. Introduction to Solar & Wind energy system. **Tariff:** Guiding principle of Tariff, different types of tariff. **Indian Electricity Rule-1956:** General Introduction	10

Numerical problems to be solved in the tutorial classes.
Text Books:
1. Electrical Power System, Subir Roy, Prentice Hall
2. Power System Engineering, Nagrath & Kothery, TMH
3. Elements of power system analysis, C.L. Wodhwa, New Age International.
4. Electrical Power System, Ashfaq Hussain, CBS Publishers & Distributors

Reference Books:
1. Electric Power transmission & Distribution, S.Sivanagaraju, S.Satyanarayana, Pearson Education.
2. A Text book on Power system Engineering, Soni, Gupta, Bhatnagar & Chakrabarti, Dhanpat Rai & Co.
3. Electric Power distribution system Engineering, 2nd Edition, T. Gonen, CRC Press.
4. www.powermin.nic.in/acts_notification/pdf/ier**1956**.pdf

B. P. Poddar Institute of Management and Technology
Department of Electrical Engineering
Course Outcome - Program Outcome –Program Specific Outcome mapping
Academic Year:2018-2019

Course Name: Power System I Course Code: EE502 Course NBA Code:C303

Sl no.	DESCRIPTION	PO(1..12) & PSO(1..2) mapping	Cognitive Levels
C 303.1	**Explain** the basic concepts and mechanical design of different Overhead Transmission lines.	PO-1,2,3,11,12 PSO-1	Understand
C 303.2	**Differentiate** different types of insulators used and their need in power system.	PO-1,2,3,11,12 PSO-1	Analyze
C 303.3	**Discuss** the principle of corona formation and its effect on Transmission lines.	PO-1,2,3,12 PSO-1,2	Understand
C 303.4	**Differentiate** different types of cables and compare their use for distribution of power.	PO-1,3,11,12 PSO-1,2	Analyze
C 303.5	**Categorize** the types of tariff of power generation, transmission and utilization.	PO-1,2,3,12 PSO-1,2	Analyze
C 303.6	**Compare** different methods of power generation. Introduction to Solar & Wind energy system.	PO-1,2,12 PSO-1,2	Analyze

COURSE OUTCOMES VS PO MAPPING (DETAILED: HIGH: 3; MEDIUM:2; LOW:1**):**

Sl.no	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C 303.1	3	3	3								3	3
C 303.2	3	3	3								3	3
C 303.3	3	3	3									3
C 303.4	3		3								3	3
C 303.5	3	3	3									3
C 303.6	3	3										3
C 303	**3**	**3**	**3**								**3**	**3**

COURSE OUTCOMES VS PSO MAPPING (DETAILED: HIGH: 3; MEDIUM:2; LOW:1**):**

Sl no.	PSO1	PSO2
C 303.1	3	-
C 303.2	3	-
C 303.3	3	3
C 303.4	3	3
C 303.5	2	2
C 303.6	2	2
C 303	**2.66**	**2.5**

B.P. PODDAR INSTITUTE OF MANAGEMENT AND TECHNOLOGY
Department of Electrical Engineering
Academic Year -2018-2019(Odd Semester)
LESSON PLAN

Program: Electrical Engineering **Credit: 4** **Contact: 3L+1T**
Paper : Power System I **Paper Code: EE502**

L.NO	Topics Covered	Books	Teaching Aids	Teaching Methodology
L1	Choice of frequency, voltage, conductors	T2, R3	Green board	Lecturing
L2	Inductance of a single phase & 3-phase line	T1, T3	Green board	Lecturing
L3	GMD and GMR	T2, W3	Green board	Lecturing
T1	Numerical problems on Inductance and GMD & GMR	T4,R2	Green board	Tutorial
L4	Electric potential on conductors	T1, T2	Green board	Lecturing
L5	Capacitance of a single phase & 3-phase line	T1,R3	Green board	Lecturing
L6	Capacitance of 3-phase line, Effect of earth	T1, W1	Green board	Lecturing
T2	Numerical problems on Capacitance calculations	W2, T4	Green board	Tutorial
L7	Line supports, towers, poles, sag in transmission line	T4, W1	Green board	Lecturing
L8	Tension and clearance calculation of sag	R3,W1	Green board	Lecturing
L9	Effect of wind and ice loading on sag	T2, W4	Green board	Lecturing
T3	Numerical problems on Sag and tension	W2, T4	Green board	Tutorial
L10	Introduction of dampers, effects of sag	T2, W4	Green board	Lecturing
L11	Insulators, String efficiency	T2, W5	Green board	Lecturing
L12	Arching shield & rings,Method of improving efficiency	T2, T4	Green board	Lecturing
T4	Numerical problems on string efficiency	T2, R1	Green board	Tutorial
L13	Methods of improving voltage distribution , tests on insulators	T3, R2	Green board	Lecturing
L14	Corona factors affecting corona	T3, R3	Green board	Lecturing
L15	Merits and demerits,Methods of reducing corona effect	T3, W4	Green board	Lecturing
T5	Numerical problems on Corona	R3, W4	Green board	Tutorial
L16	Cables, components,Capacitance of single core cable	T3, W3	Green board	Lecturing
L17	Capacitance of 3 core cable	T1, T4	Green board	Lecturing
L18	Grading of cables, dielectric loss and loss angle.	T4,W2	Green board	Lecturing
T6	Numerical problems on corona and cables	R3, W4	Green board	Tutorial,

L19	Overhead transmission lines, short transmission lines	T1, W4	Projector	PPT
L20	Medium transmission lines- End condenser method.	T1, W4	Projector	PPT
L21	Nominal T method & π method	T4, R3	Projector	PPT
T7	Numerical problems on short transmission lines, cables.	T1, R2	Green board	Tutorial
L22	Long Transmission lines	T1, R3	Green board	Lecturing
L23	Generalized constants of a transmission lines	T1, R2	Green board	Lecturing
L24	Ferranti effect, surge impedance loading	R2, T4	Green board	Lecturing
T8	Numerical Problems on medium transmission line.	R2, T4	Green board	Tutorial
L25	Power circle diagram.	R2, T4	Green board	Lecturing
L26	Coal fired power station	R2, T4	Green board	Lecturing
L27	Working principles of coal fired power station	R2, T4	Green board	Lecturing
T9	Numerical Problems on long transmission line.	W2, T4	Green board	Tutorial
L28	Hydro electric power station,	W1, T4	Green board	Lecturing
L29	Nuclear power Station.	W1, T4	Green board	Tutorial
L30	Introduction to Solar & Wind energy system	T2, R2	Green board	Lecturing
T10	Numerical problems on ABCD parameters.	W2, T4	Green board	Tutorial
L31	**Tariff:**Guiding principle of Tariff, different types of tariff.	T1, R3,	Green board	Lecturing
L32	**Indian Electricity Rule-1956:** General Introduction.	T1,T3	Green board	Lecturing

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R1. Electric Power transmission & Distribution, S.Sivanagaraju, S.Satyanarayana,Pearson Education.
R2. A Text book on Power system Engineering, Soni, Gupta, Bhatnagar & Chakrabarti,Dhanpat Rai **R3.** Electric Power distribution system Engineering, 2nd Edition, T. Gonen, CRC Press.

Web References:

W1. nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/power-system/.../1_7.htm
W2. www.engineeringenotes.com › Electrical Engineering › Cables › Single Core Cables
W3.nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/power- system/.../10_2.html
W4. nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/power- system/.../10_11.html
W5. www.powermin.nic.in/acts notification/pdf/ier**1956**.pdf

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Academic Year -2018-2019(Odd Semester)

Gap analysis of Power System I (EE-502)

Gaps	Within/Beyond	CO	PO/PSO
Introduction to EHV transmission- Brief description of the system with working & constructional details.	Beyond	_____	PO1,PO2,PO12,PSO1
Series and shunt compensation, Introduction to FACTS	Within	CO1	PO1,PO2,PO12,PSO1

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Web References

Course Name: Power System I
Course Code: EE-502
Course Coordinator: Madhumita Kundu (Mondal)

1. nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/power-system/.../1_7.htm
   www.engineeringenotes.com › Electrical Engineering › Cables › Single Core Cables

2. nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/power-system/.../10_2.html

3. nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/power- system/.../10_11.html

4. www.powermin.nic.in/acts_notification/pdf/ier**1956**.pdf