Department of Electrical Engineering

Details of Lesson Plan

S.No.	Particulars	Details
1.	Course Name	Power System-I
2.	Course Code	EE-601
3.	Academic Year	2023-24
4.	Semester	6th
5.	Number of Lesson plans	44
6.	Faculty Assigned	Mr. Bhanu Pratap Singh Jamwal

Faculty Signature

Lesson Plan No. 1	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Distribution system. b. Understand the various classifications of Distribution systems.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Do you know how electric power is distributed to the load by the sub stations? Have you ever visited any substation? 2. **Development** (30 minutes) a. Concept of Distribution system. b. Description of each block diagram in detail c. Classification of Distribution system d. Explanation of AC distribution system **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage/108/105/108105104/MP4/mod01lec01.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Distribution system Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Analyse the various connection schemes in Distribution system b. Estimate the drop occurring the various connection schemes
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Do you ever noticed the connection pattern in your nearby distribution system? Have you ever noticed the lesser voltage in the last connected household of the distribution network? 2. **Development** (30 minutes) a. Types of connection schemes in distribution system b. Description of radial distribution system c. Description of ring main distribution system d. Description of interconnected distribution system **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec01.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on various connection schemes in Distribution system Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Categorise the various DC Distributors b. Analyse the various distributor schemes
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions From how many sources you can supply a load? From where your house holds are supplied with electrical power? 2. **Development** (30 minutes) a. Types of DC Distributors b. Explanation of DC Distributor fed at one end. c. Explanation of DC Distributor fed at both ends. d. Explanation of DC Distributor fed at centre **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec04.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on DC Distributors Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 4	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of concentrated loading b. Analyse the schematic for singly fed distribution system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions In how many different ways a distributor can be loaded? What are the problems we can face if we have single power supply source? 2. **Development** (30 minutes) a. Different types of Loading schemes b. Schematic of DC Distributor fed at one end. c. Problems of DC Distributor fed at one end. d. Uses of DC Distributor fed at one end **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec06.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on concentrated loading Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 5	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of uniform loading b. Analyse the schematic for singly fed uniformly loaded distribution system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions How can we equalise the load on a distributor? What are the problems we can face in equalising the load? 2. **Development** (30 minutes) a. Concept of Uniform Loading b. Schematic of singly fed uniformly loaded distributor. c. Problems in practically implementing a uniform loading. **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec07.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on uniform loading Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 6	**Course Name: Power System-I**	**Course No.: EE-601**

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of concentrated loading b. Analyse the schematic for singly fed concentrated loaded distribution system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Practically Distribution system has which type of loading? What are the problems we can face in Concentrated loading? 2. **Development** (30 minutes) a. Concept of concentrated Loading b. Schematic of singly fed concentrated loaded distributor. c. Problems in practically implementing a Concentrated loading. **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec08.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on concentrated loading Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 7	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of Doubly fed distribution system b. Analyse the schematic for doubly fed uniformly loaded distribution system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What happens when a single load is supplied by two sources? Can we increase the number of sources from more than two? 2. **Development** (30 minutes) a. Concept of distribution system fed at two ends b. Schematic of doubly fed uniformly loaded distributor. c. Mathematical calculations relating to this schematic **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec09.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Doubly fed distribution system Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 8	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Discuss the application of both types of loading techniques b. Appraise the various issues and problems in uniform and concentrated loaded system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Can a system have both types of loadings in distribution system? Can we evaluate the circuit parameters in this condition? 2. **Development** (30 minutes) a. Concept of distribution system fed with both techniques. b. Mathematical calculations relating to this connection scheme **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec10.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on uniform and concentrated loaded system. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 9	**Course Name: Power System-I**	**Course No.: EE-601**

Objectives	At the end of the lesson the student shall be able to: a. Investigate the two wire DC system. b. Appraise the requirement for 3-wire DC system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions How many wires are there in a DC system? Can we have 3 wires in a DC system and Why we need 3 wires? 2. **Development** (30 minutes) a. Concept of 2- wire DC system b. Requirement and procedure to get 3 wire DC system. c. Role of Balancer sets in 3 wire DC system **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec11.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on two wire DC system Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 10	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the distribution of current in three wire DC system b. Analyse the current distribution according to the load on the two sides of three wire system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Will it be possible to divide the load in 3 wire DC System? If yes, then what will be the percentage of division? 2. **Development** (30 minutes) a. Concept of current distribution b. procedure of current distribution in 3 wire DC system. **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec12.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on three wire DC system Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 11	**Course Name: Power System-I**	**Course No.: EE-601**

Objectives	At the end of the lesson the student shall be able to: a. Understand the various AC distribution techniques b. Appraise the requirement for AC distribution system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What type of electrical supply we are using at our homes? What is difference between AC and DC distribution system? 2. **Development** (30 minutes) a. Concept of AC distribution system b. Requirement of AC distribution system. c. Various methods to solve AC distribution problems. **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec13.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on AC distribution techniques Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 12	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Investigate the star connection of loads b. Appraise the requirement for four wire star connected loads.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Can we have four wire AC supply system? What do you mean by star connection of loads? 2. **Development** (30 minutes) a. Concept of 4- wire AC system b. Requirement for star connection of loads c. Consequences of unbalanced loads **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec14.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on star connection of loads Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 13	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Categorize the various types of Conductors b. Appraise the application of different conductors as per electrical parameters.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you mean by conductors? Have you ever noticed conductors on Transmission Lines? 2. **Development** (30 minutes) a. Concept of Conductors in Transmission Lines b. Various types of conductor materials c. Application of conductors **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec16.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on various types of Conductors Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 14	**Course Name: Power System-I**	**Course No.: EE-601**

Objectives	At the end of the lesson the student shall be able to: a. Understand the parameters like Resistance, Inductance and capacitance b. Role of Resistance, Inductance and capacitance in Transmission system.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you mean by Resistance? Have you ever seen Capacitor and Inductor? 2. **Development** (30 minutes) a. Concept of Resistance, Inductance and Capacitance. b. Effect of these parameters of transmission line **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec17.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Resistance, Inductance and capacitance Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 15	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: Flux linkages in line conductors a. Describe the concept of flux linkages in Line conductors b. Estimate the relations related to Flux linkages
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is magnetism? What is reason for this magnetism? 2. **Development** (30 minutes) a. Flux linkages b. Relations related to flux linkages **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec18.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on flux linkages in Line conductors Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 16	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Examine the inductance in case of single phase supply. b. Justify the relations related to the Inductance.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Can there be any inductance in case of single phase supply? What if there is excess induction in the line? 2. **Development** (30 minutes) a. Explanation of Inductance of Single phase line b. Derivation of the relation c. Calculation of overall inductance **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec18.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on inductance in case of single phase supply Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 17	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Investigate the inductance for 3 phase line b. Justify the relations related to the 3 phase line inductance.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What are effects of Inductance on Transmission Line? What if we have inductive effect of severe value in three phase supply? 2. **Development** (30 minutes) a. Explanation of Inductance of Single phase line b. Derivation of the relation c. Calculation of overall inductance **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec20.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on inductance for 3 phase line Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 18	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: Double circuit lines a. Investigate the double circuit transmission lines b. Formulate the importance of Double circuit transmission Lines.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Have you ever noticed two three phase lines running parallel on Single transmission Tower? Is this tower supply power to a single place or different? 2. **Development** (30 minutes) a. Definition of double circuit lines b. Benefits of having double circuit lines **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec20.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on double circuit transmission lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 19	**Course Name: Power System-I**	**Course No.: EE-601**

Objectives	At the end of the lesson the student shall be able to: a. Apply the concept of GMD and GMR. b. Appraise the requirement for GMD and GMR
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Is there any effect of Diameter on conductor resistance? Is there any means to reduce the Diameter? 2. **Development** (30 minutes) a. Concept of GMD and GMR b. Consequences of using GMD and GMR **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec21.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on GMD and GMR Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 20	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Analyse the concept of skin effect and proximity effect. b. Assess the merits and demerits of skin effect.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions How much conductor volume is used for power transfer? Is there any effect on conductors if they placed too closed to each other? 2. **Development** (30 minutes) a. Concept of sKin effect b. Problems with skin effect in transmission lines c. Concept of Proximity effect **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec22.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on skin effect and proximity effect. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 21	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: Bundled Conductors a. Understand the Bundling of conductors in Transmission lines b. Appraise the requirement for Bundled conductors
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Can we use more than one conductor for each phase? Is it beneficial for transmission or not? 2. **Development** (30 minutes) a. Concept of Bundling of conductors b. Requirement for Bundled conductors c. Consequences of Bundling of Conductors **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec23.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Bundling of conductors in Transmission lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 22	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Investigate the phenomenon of Capacitance in single phase Lines b. Appraise the effect of Capacitance in single phase Lines
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you mean by capacitor? What effect does capacitance on the Circuit? 2. **Development** (30 minutes) a. Capacitance and its effect b. Phenomenon of Capacitance in single phase lines c. Consequences of Capacitance **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec24.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Capacitance in single phase Lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 23	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Investigate the phenomenon of Capacitance in three phase Lines b. Appraise the effect of Capacitance in three phase Lines
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you mean by three phase capacitance? Is it good for circuit or not? 2. **Development** (30 minutes) a. Phenomenon of Capacitance in three phase lines b. Consequences and relation for three phase Capacitance **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod01lec25.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Capacitance in three phase Lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 24	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of Electromagnetism and Electrostatics. b. Estimate the effect on transmission line due to electromagnetism
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you mean by Electrostatics? What do you mean by Electromagnetism? 2. **Development** (30 minutes) a. Concept of Electromagnetism and Electrostatics b. Electrostatics in Transmission lines c. Electromagnetism in Transmission lines **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod03lec32.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Electromagnetism and Electrostatics Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 25	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Categorize the various types of Transmission lines b. Appraise the application of different lines as per their rating and length.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do think how long a transmission line can be? What will be the maximum transmission voltage? 2. **Development** (30 minutes) a. Types of Transmission Lines b. Rating of Lines c. Application depending upon length and rating. **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec30.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on types of Transmission lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 26	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of single phase short lines b. Evaluate the respective relations for single phase short lines
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is the length of short lines? What is the approximate length of lines near your homes? 2. **Development** (30 minutes) a. Concept of Single phase short lines b. Derivation of the Relations for Single phase short lines c. Applications of single phase short lines **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod03lec31.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on single phase short lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 27	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of Three phase short lines b. Evaluate the respective relations for three phase short lines
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is the length of short lines? What is the approximate length of lines near your homes? 2. **Development** (30 minutes) a. Concept of Single phase short lines b. Derivation of the Relations for Single phase short lines c. Applications of single phase short lines **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod03lec32.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Three phase short lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 28	**Course Name: Power System-I**	**Course No.: EE-601**

Objectives	At the end of the lesson the student shall be able to: a. Investigate the medium transmission lines b. Assess the methods used to solve the medium lines problems.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is the length for medium lines? What are the different parameters that can exist in medium lines? 2. **Development** (30 minutes) a. Concept of medium transmission lines b. Derivation of Nominal T method for the calculation of the performance of the line **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod03lec33.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Nominal T method Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 29	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Investigate the medium transmission lines b. Assess the methods used to solve the medium lines problems.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Is there any other method to solve medium line problems? In how many ways the parameters in medium lines can be arranged? 2. **Development** (30 minutes) a. Concept of medium transmission lines b. Derivation of Nominal Pi method for the calculation of the performance of the line **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod03lec34.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on medium transmission lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 30	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Investigate the Long transmission lines b. Assess the methods used to solve the Long lines problems.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is the maximum transmission line length in India? What can be the possible problems in Long lines? 2. **Development** (30 minutes) a. Concept of Long Transmission Lines b. Derivation of the performance parameters of long lines. **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod03lec36.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Long transmission lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 31	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Evaluate the ABCD parameters for determination of transmission line performance b. Appraise the applications of ABCD constants
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do we use to calculate the performance of power system? What do you mean by Constants? 2. **Development** (30 minutes) a. Concept of ABCD parameters b. Requirement for ABCD parameters c. Various performance characteristics **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec36.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on ABCD parameters Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 32	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of surge impedance b. Analyse the effect of surge impedance loading on the transmission line.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you mean by Surge? What happens when a system is subjected to high voltage? 2. **Development** (30 minutes) a. Concept of Surge Impedance b. Importance of Surge impedance in case of Transmission lines c. Derivation of Important relations **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec38.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on surge impedance Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 33	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Investigate the concept of Ferranti effect b. Assess the remedies to overcome Ferranti effect
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Is it possible that sending end voltage is less than receiving end in case of Transmission system? What can be the possible reason for that? 2. **Development** (30 minutes) a. Reason for High capacitance in Long lines b. Concept of Ferranti effect c. Measures to reduce Ferranti effect. **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec39.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Ferranti effect Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 34	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Assess the type of material used a particular type of Insulator b. Appraise the different types of insulators
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you mean by insulators? Is there any requirement for insulator in transmission lines? 2. **Development** (30 minutes) a. Concept of Insulators b. Materials used for different types of insulators c. Different types of insulators **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec40.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on different types of insulators Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 35	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Investigate the Potential distribution over a string of suspension insulators b. Estimate the expression for potential distribution
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is string? Have you ever noticed an insulator string of transmission line? 2. **Development** (30 minutes) a. Concept of insulator string b. Potential distribution over a string of suspension insulators **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec41.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Potential distribution over a string of suspension insulators Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 36	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Examine the methods used for equalizing the potential. b. Identify the problems faced while equalizing the potential
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Do we have same amount of voltage on each insulator? What effect do different voltages can have? 2. **Development** (30 minutes) a. Requirement for equalizing the potential b. Problem faced in equalizing the potential c. Methods used for equalizing the potential. **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec42.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on methods used for equalizing the potential Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 37	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the phenomenon of corona formation b. Analyse the different factors affecting the corona formation
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Have you ever noticed hissing sound near transmission lines? What do think that from where this sound is coming from? 2. **Development** (30 minutes) a. Concept of Corona formation b. Different factors affecting the corona formation c. Effects of corona formation **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage/108/105/108105104/MP4/mod04lec20.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on corona formation Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 38	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of Visual & critical disruptive voltage b. Evaluate the expressions for Visual & critical disruptive voltage
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Have you ever noticed violet glow around the transmission conductor? Does this glow is regarded as loss? 2. **Development** (30 minutes) a. Visual & critical disruptive voltage b. Relations for Visual & critical disruptive voltage **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage/108/105/108105104/MP4/mod05lec21.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Visual & critical disruptive voltage Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 39	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Estimate the power loss due to corona b. Analyse the expressions for power loss due to corona
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is the percentage of losses in transmission lines? How can we reduce these losses? 2. **Development** (30 minutes) a. Concept of power loss b. power loss due to corona c. Consequences of power loss due to corona **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage/108/105/108105104/MP4/mod05lec22.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on power loss due to corona Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 40	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Discuss the mechanical design of transmission line b. Appraise the various aspects of mechanical design of lines
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What are the non electrical requirements in transmission lines? What are mechanical requirements? 2. **Development** (30 minutes) a. Concept of mechanical design of transmission line b. Requirement for mechanical design **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec38.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on mechanical design Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 41	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: Calculation of sag and tension a. Assess the requirement of sag and span in transmission lines b. Investigate the concept of tension in lines
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Are the transmission lines straight or lose? What do you mean by span? 2. **Development** (30 minutes) a. Concept of sag b. Concept of span c. Calculation of sag and span **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec41.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on sag and span Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 42	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: Equivalent span length and sag a. Investigate the equivalent span length and sag b. Evaluate the relation required for span length and sag
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is sag? What is span? 2. **Development** (30 minutes) a. Concept of equivalent span length b. Requirement for span c. Concept of equivalent sag **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec34.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on equivalent span length Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 43	Course Name: Power System-I	Course No.: EE-601

Objectives	At the end of the lesson the student shall be able to: a. Assess the effect of ice and wind loading on transmission lines. b. Appraise the requirement to deal with the problem of ice and wind loading.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Do you ever notice ice accumulation on transmission? What effect does wind have on transmission lines? 2. **Development** (30 minutes) a. Effect of Ice loading on transmission lines b. Effect of wind loading on transmission lines c. Calculation of the related relations **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec39.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Effect of Ice loading on transmission lines Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 44	**Course Name: Power System-I**	**Course No.: EE-601**

Objectives	At the end of the lesson the student shall be able to: a. Investigate the Conductor vibration& vibration dampers b. Evaluate the relations related to conductor vibrations
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What is vibration? Is there any kind of vibration in transmission lines? 2. **Development** (30 minutes) a. Concept of Conductor vibration b. Concept of vibration dampers c. Derivation of the relations **3. Exercise** (5 minutes) – Ask students to explain each term with the help of examples. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video lecture https://nptel.ac.in/content/storage2/117/105/117105140/MP4/mod04lec40.mp4 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Conductor vibration Spend 5 minutes to evaluate student assimilation of the lesson contents