



Andhra Loyola Institute of Engineering and Technology

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Department of EEE

Teacher/Instructor: Dr. G. Naveen Kumar, Professor,

Lesson Plan for a Day

Course Name: Induction and Synchronous Machines

Year/Sem: II/ II

Course Objectives

- Understand the principle of operation and performance of 3-phase induction motor.
- Quantify the performance of induction motor and induction generator in terms of torque and slip.
- To understand the torque producing mechanism of a single phase induction motor.
- To understand the principle of emf generation, the effect of armature reaction and predetermination of voltage regulation in synchronous generators.
- To study parallel operation and control of real and reactive powers for synchronous generators.
- To understand the operation, performance and starting methods of synchronous motors.

Course Outcomes

1	Factual	<ul style="list-style-type: none">• Able to explain the operation and performance of three phase induction motor.
2	Conceptual	<ul style="list-style-type: none">• Able to analyze the torque-speed relation, performance of induction motor and induction generator.
3	Procedural	<ul style="list-style-type: none">• Able to implement the starting of single phase induction motors.• Able to perform winding design and predetermine the regulation of synchronous generators
4	Applied	<ul style="list-style-type: none">• Able to explain hunting phenomenon, implement methods of starting and correction of power factor with synchronous motor

Text Books:

1. **Electrical Machines** by P.S. Bhimbra, Khanna Publishers
2. **Electric Machinery** by A.E.Fitzgerald, Charles Kingsley, Stephen D.Umans, TMH.

Reference Books:

1. **Performance and design of AC machines** – M.G. Say
2. **Alternating Current Machines** by A.F.Puchstein, T.C. Lloyd, A.G. Conrad, ASIA Publishing House
3. **Electrical Machinery Fundamentals** by Stephen J Chapman McGraw Hill education, 2010.
4. **Electrical Machines** by R.K.Rajput, Lakshmi publications, 5th edition

1	Factual	<ul style="list-style-type: none"> ● Reading Prerequisite concepts- EM-1
2	Conceptual	<ul style="list-style-type: none"> ● Video Lectures related to EMF ● NPTEL Videos ● Links from the Internet ● Animations of coordinate systems ● Examples
3	Procedural	<ul style="list-style-type: none"> ● Refer to text book ● Quiz
4	Applied	<ul style="list-style-type: none"> ● Solving Exercises ● Implementing ● Assignments ● Quiz etc...

Schedule and Sequence: Day Plan

EM-II Lesson Plan– Total Classes: 75

Session/ week/ Lesson-1 Total Classes	Topic	Objectives	Before Class - Videos, e-Books, Case studies	In-Class – Activities, Quiz (Micro teaching)	Post Class - Assignment, Discussion Forum
Day-1 UNIT-1	Introduction to The Subject	To introduce Basics of this subject	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Discuss pre-requisites (10 Min) • PPT Presentation (30 Min) • Discussion or Poll activity (5 min) • Summery (5min) • Doubts clarification (10min) 	<ul style="list-style-type: none"> • Discussion forum on the topic in the Class/Group • Review on the topic • Share material on the topic • Able to explain the operation and performance of three phase induction motor
Day-2	Construction Details of Cage And Wound Rotor Machines	To understand Concepts Construction Details Of Cage And Wound Rotor Machines	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing Video Link : Three phase induction motor construction - YouTube	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • quiz (10min) • Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor.
Day -3	Construction Details of Cage And Wound Rotor Machines	To understand Concepts Construction Details of Cage And Wound Rotor	Text Book: https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing Video Link : Construction of Three	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor • Solve Exercises.

		Machines	Phase Induction Motor Electrical & Electronics Engineering - YouTube		
Day -4	Production of Rotating Magnetic Field	To know about Production of Rotating Magnetic Field	Text Book: https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: Induction Motor animation I: The Rotating Magnetic Field RMF - YouTube	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> ● Able to explain the operation and performance of three phase induction motor ● Solve Exercises.
Day -5	Principle of Operation	To know Principle of Operation	Text Book: https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: Principle of Operation - Three Phase Induction Motor - Electrical Machines 3 - YouTube	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> ● Able to explain the operation and performance of three phase induction motor ● Solve Exercises.
Day -6	Rotor EMF and Rotor Frequency	To get knowledge Rotor EMF and Rotor Frequency	Video Link: Tesla Model 3's motor - The Brilliant Engineering behind it - YouTube	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> ● Able to explain the operation and performance of three phase induction motor ● Solve Exercises.

Day -7	Rotor Current and Pf at Standstill And During Running Conditions	To get knowledge Rotor Current And Pf at Standstill And During Running Conditions	Text Book: https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor • Solve Exercises.
Day -8	Rotor Power Input	To get knowledge on Rotor Power Input	Text Book: https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor • Solve Exercises.
Day -9	Rotor Copper Loss and Mechanical Power Developed and their Interrelationship	Calculation of Rotor Copper Loss And Mechanical Power Developed And Their Interrelationship	Text Book: https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor • Solve Exercises.
Day-10	Equivalent Circuit – Phasor Diagram	Calculation of Equivalent Circuit – Phasor Diagram	Text Book https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor • Solve Exercises.
Day-11	Numerical Problems	Problematic analysis	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor • Post on Discussion Forum.

Day-12	Numerical Problems	Problematic analysis	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor • Post on Discussion Forum.
Day-13	Numerical Problems	Problematic analysis	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> • Able to explain the operation and performance of three phase induction motor • Post on Discussion Forum.
Day -14 UNIT 2	Torque Equation	To understand concept of Torque Equation	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: https://www.youtube.com/watch?v=DeIf_eQRi0E	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> • Able to analyze the torque-speed relation, performance of induction motor and induction generator
Day -15	Expressions for Maximum Torque and Starting Torque	To understand concept Maximum Torque And Starting Torque	Text_Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: https://www.youtube.com/watch?v=DeIf_eQRi0E	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> • Able to analyze the torque-speed relation, performance of induction motor and induction generator
Day -16	Torque Slip Characteristics	To draw Torque Slip Characteristics	Text Book https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	<p>Learning outcomes – Students should be able to:</p> <ul style="list-style-type: none"> • Able to analyze the torque-speed relation, performance of induction motor and induction generator

			Video Link: Torque Slip Characteristics of Three phase induction motor - YouTube		
Day -17	Double Cage and Deep Bar Rotors	To understand concept Double Cage And Deep Bar Rotors	Text Book : DDep Bar Double Cage Induction Motor Electrical4U DDep Bar Double Cage Induction Motor - Electrical Volt Video Link: Double cage induction motor - YouTube	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: ● Able to analyze the torque-speed relation, performance of induction motor and induction generator ● Exercises.
Day -18	Crawling and Cogging	To understand concept Crawling And Cogging	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: Cogging Crawling effect in a 3-Phase Induction motor Interview Question PiSquare Academy - YouTube	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: ● Able to analyze the torque-speed relation, performance of induction motor and induction generator ● Exercises.
Day -19	Speed Control of Induction Motor With V/F Method	To understand concept Of Speed Control Of Induction Motor With V/F Method	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: https://www.youtube.com/watch?v=QjrpFiUsiPQ	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: ● Able to analyze the torque-speed relation, performance of induction motor and induction generator ● Exercises.

Day-20	No Load and Blocked Rotor Tests	To know concept of No Load Tests	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: https://www.youtube.com/watch?v=EjoarFx9-fA	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to analyze the torque-speed relation, performance of induction motor and induction generator • Assignment.
Day-21	No Load and Blocked Rotor Tests	To know concept of Blocked Rotor Test	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: https://www.youtube.com/watch?v=EjoarFx9-fA	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to analyze the torque-speed relation, performance of induction motor and induction generator • Post on Discussion Form.
Day-22	Circle Diagram for Predetermination of Performance	To know concept of Circle Diagram	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to analyze the torque-speed relation, performance of induction motor and induction generator
Day-23	Circle Diagram for Predetermination of Performance	To know concept of Circle Diagram	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to analyze the torque-speed relation, performance of induction motor and induction generator

Day-24	Methods of Starting	To know the Starting Methods Of I.M	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Able to analyze the torque-speed relation, performance of induction motor and induction generator.
Day-25	Starting Current and Torque Calculations	To calculate Starting Current And Torque	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Able to analyze the torque-speed relation, performance of induction motor and induction generator.
Day-26	Induction Generator Operation	To know about Induction Generator Operation	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing Video Link: https://www.youtube.com/watch?v=cNKklBwnhY4	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Able to analyze the torque-speed relation, performance of induction motor and induction generator.
Day-27	Numerical Problems.	To understand stored energy in capacitor	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Able to analyze the torque-speed relation, performance of induction motor and induction generator.
Day-28	Numerical Problems.	Problematic analysis	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Able to analyze the torque-speed relation, performance of induction motor and induction generator.

Day-29	Numerical Problems.	Problematic analysis	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to analyze the torque-speed relation, performance of induction motor and induction generator.
UNIT 3 Day-30	Introduction to Methods of starting of three phase Induction motors: DOL	To know the methods of starting of three phase Induction motors: DOL	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain methods of starting of three phase Induction motors: DOL.
Day-31	Introduction to Auto transformer	To know the concept of Auto transformer	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain concept of Auto transformer.
Day-32	Introduction to Star-Delta and rotor resistance methods	To know the concept of Star-Delta and rotor resistance methods	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain concept of Star-Delta and rotor resistance methods.
Day-33	Introduction to Single Phase Induction Motors	To know the concept of Single Phase Induction Motors	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors. • Implement simulation circuit.

Day-34	Constructional Features	To know Construction of IM	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors.
Day-35	Constructional Features	To know Construction of IM	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors.
Day-36	Equivalent Circuit	Problem solving on Equivalent Circuit	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors.
Day-37	Problem of Starting methods	To know concepts Starting of IM	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors. • Solve Exercises
Day-38	Double Revolving Field Theory,	To know concept Double Revolving Field Theory	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors.

Day-39	Starting Methods Shaded Pole Motors,	To know concept of Starting Methods Shaded Pole Motors,	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors.
Day-40	AC Series Motor.	To know concept of AC Series Motor.	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors. • Exercises
Day-41	Numerical problems	Problem solving I.M	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors. • Exercises
Day-42	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Able to explain design procedure for transformers and three phase induction motors. • Exercises
UNIT 4 Day -43	Constructional Features of Non-Salient	To know concept of Constructional Features Of Non-Salient	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors.

Day-44	Constructional Features of Salient Pole Type	To know concept of Constructional Features of Salient Pole Type	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors
Day-45	Armature Windings	To know concept of Armature Windings	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors
Day-46	Distributed And Concentrated Windings	To know concept of Distributed and Concentrated Windings	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors
Day-47	Distribution– Pitch And Winding Factors	To know concept of Distribution– Pitch And Winding Factors	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors
Day-48	E.M.F Equation	To derive the E.M.F Equation	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors

Day-49	Improvements of Waveform	To know concept of Improvements of Waveform And Armature Reaction	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors
Day-50	Armature Reaction	To know concept of Armature Reaction	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors • Assignment
Day-51	Voltage Regulation by Synchronous Impedance Method	Calculation of Regulation By Synchronous Impedance Method	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors. • Solve Exercises.
Day-52	Voltage Regulation by MMF Method	Calculation of Regulation By MMF Method	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors. • Solve Exercises.
Day-53	Voltage Regulation by Potier Triangle Method Phasor Diagrams	Calculation of Regulation By Potier Triangle Method Phasor Diagrams	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors. • Solve Exercises.

Day-54	Two Reaction Analysis of Salient Pole Machines And Phasor Diagram.	To Understand concept of Two Reaction Analysis Of Salient Pole Machines	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors.
Day-55	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors. • Solve Exercises.
Day-56	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors. • Solve Exercises.
Day-57	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors. • Solve Exercises.
Day-58	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> • Revise previous class – (10 mins) • PPT presentation – (30 min) • Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> • Analyze the concept behind starting methods of single phase induction motors. • Solve Exercises.

Day-59	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.
Day-60	Parallel Operation with Infinite Bus And Other Alternators	To know the concept of Parallel Operation With Infinite Bus And Other Alternators	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.
Day-61	Parallel Operation with Infinite Bus And Other Alternators	To know the concept of Parallel Operation With Infinite Bus And Other Alternators	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.
Day-62	Synchronizing Power	To know the concept of Synchronizing Power	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.
Day-63	Load Sharing	To know about Load Sharing	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.

Day-64	Control of Real And Reactive Power	To know about Control of Real And Reactive Power	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.
Day-65	Control of Real And Reactive Power	To know about Control of Real And Reactive Power	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.
Day -66	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.
Day -67	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.
Day -68	Numerical problems	Problem solving	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYQG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Analyze the concept behind starting methods of single phase induction motors. ● Solve Exercises.

UNIT 5 Day -69	Synchronous Motor Principle and Theory of Operation	To get the knowledge on Synchronous Motor Principle And Theory of Operation	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of starting and correction of power factor with synchronous motor. ● Solve Exercises.
Day-70	Synchronous Motor Principle And Theory of Operation	To get the knowledge on Synchronous Motor Principle And Theory of Operation	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of starting and correction of power factor with synchronous motor. ● Solve Exercises.
Day-71	Phasor Diagram	To get the knowledge on Phasor Diagram	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of starting and correction of power factor with synchronous motor. ● Solve Exercises.
Day -72	Starting Torque	To know the concept of Starting Torque	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of starting and correction of power factor with synchronous motor. ● Solve Exercises.
Day -73	Variation of Current And Power Factor With Excitation	To know the concept of Variation Of Current And Power Factor With Excitation	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of starting and correction of power factor with synchronous motor. ● Solve Exercises.

Day -74	Synchronous Condenser	To know the concept of Synchronous Condenser	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of staring and correction of power factor with synchronous motor. ● Solve Exercises.
Day -75	Mathematical Analysis for Power Developed	To understand the operation, performance and starting methods of synchronous motors	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of staring and correction of power factor with synchronous motor. ● Solve Exercises.
Day -76	Hunting and its Suppression	To understand the operation, performance and starting methods of synchronous motors	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of staring and correction of power factor with synchronous motor. ● Solve Exercises.
Day -77	Methods of Starting – Applications.	To understand the operation, performance and starting methods of synchronous motors	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of staring and correction of power factor with synchronous motor. ● Solve Exercises.
Day -78	Numerical Problems	To understand the operation, performance and starting methods of synchronous motors	Text Book : https://drive.google.com/file/d/1hFNZveKLUY9fMvikDQ81GgwzhYOG5vjJ/view?usp=sharing	<ul style="list-style-type: none"> ● Revise previous class – (10 mins) ● PPT presentation – (30 min) ● Doubts clarification (10 min) 	Learning outcomes – Students should be able to: <ul style="list-style-type: none"> ● Describe the hunting phenomenon; implement methods of staring and correction of power factor with synchronous motor. ● Solve Exercises.

