

### ACADEMIC LESSON PLAN OF WINTER 2022

Discipline: ELECTRICAL	Semester: 5 <sup>TH</sup> Sem Sec (A)	Name of the Teaching Faculty: Amit Kumar Bisoyi
Subject: ENERGY CONVERSION– II	No. of days/per week class allotted: 4p/week	Semester From: 15 <sup>th</sup> Sept. 2022 to 22 <sup>nd</sup> Dec 2022  No. of Weeks: 15 weeks
1 <sup>st</sup>	1 <sup>st</sup>	<b>Unit-1:ALTERNATOR</b> 1.1 Types of alternator and their constructional features
	2 <sup>nd</sup>	1.2 Basic working principle of alternator and establish the relation between speed and frequency
	3 <sup>rd</sup>	1.3 Explain terminology in armature winding, and derive expressions for winding factors (Pitch factor, Distribution factor).
	4 <sup>th</sup>	1.4 Explain harmonics, its causes and impact on winding factor.
2 <sup>nd</sup>	1 <sup>st</sup>	1.5 Derive E.M.F equation. (Solve numerical problems (contd.))
	2 <sup>nd</sup>	1.5 Derive E.M.F equation. (Solve numerical problems
	3 <sup>rd</sup>	1.6 Explain Armature reaction and its effect on emf at different pf of load (contd.)
	4 <sup>th</sup>	1.6 Explain Armature reaction and its effect on emf at different pf of load.
3 <sup>rd</sup>	1 <sup>st</sup>	1.7 Draw the vector diagram of loaded alternator. (Solve numerical problems)
	2 <sup>nd</sup>	1.8 State and explain testing of alternator (open circuit and short circuit methods) (Solve numerical problems).(contd.)
	3 <sup>rd</sup>	1.8 State and explain testing of alternator (open circuit and short circuit methods) (Solve numerical problems).
	4 <sup>th</sup>	1.9 Determination of voltage regulation of Alternator by direct loading and synchronous impedance method
4 <sup>th</sup>	1 <sup>st</sup>	1.10 Explain parallel operation of alternator using synchro-scope, dark and bright lamp method
	2 <sup>nd</sup>	1.11 Explain distribution of load by parallel connected alternators
	3 <sup>rd</sup>	<b>Unit-2:SYNCHRONOUS MOTOR</b> 2.1 Explain constructional feature of Synchronous Motor. 2.2 Explain principles of operation, concept of load angle.
	4 <sup>th</sup>	2.3 Explain effect of varying load with constant excitation(cont..)
5 <sup>th</sup>	1 <sup>st</sup>	2.3 Explain effect of varying load with constant excitation
	2 <sup>nd</sup>	2.4 Explain effect of varying excitation with constant load.
	3 <sup>rd</sup>	2.5 Derive torque, power developed(cont..)

	4 <sup>th</sup>	2.5 Derive torque, power developed. 2.6 Explain power angle characteristics of cylindrical rotor motor.
6 <sup>th</sup>	1 <sup>st</sup>	2.7 Explain effect of excitation on Armature current and power factor. 2.8 Explain Hunting & function of Damper Bars.
	2 <sup>nd</sup>	2.9 Describe method of starting of Synchronous motor.(cont..)
	3 <sup>rd</sup>	2.9 Describe method of starting of Synchronous motor. 2.10 State application of synchronous motor
	4 <sup>th</sup>	<b>Unit-3: THREE PHASE INDUCTION MOTOR</b> 3. 1 Explain and derive production of rotating magnetic field.
7 <sup>th</sup>	1 <sup>st</sup>	3. 2 Explain constructional feature of Squirrel cage and Slip ring induction motor.
	2 <sup>nd</sup>	3. 3 Explain principles of operation of 3-phase Induction motor.
	3 <sup>rd</sup>	3. 4 Explain slip speed, slip and slip relation with rotor quantities
	4 <sup>th</sup>	3. 5 Derive Torque during starting and running and conditions for maximum torque. (solve numerical problems) (contd.)
8 <sup>th</sup>	1 <sup>st</sup>	3. 5 Derive Torque during starting and running and conditions for maximum torque. (solve numerical problems)
	2 <sup>nd</sup>	3. 6 Derive Torque-slip characteristics
	3 <sup>rd</sup>	3. 7 Derive relation between full load torque and starting torque etc. (solve numerical problems).
	4 <sup>th</sup>	3. 8 Determine the relations between Rotor Copper loss, Rotor output and Gross Torque, and relationship of slip with rotor copper loss. (solve numerical problems)
9 <sup>th</sup>	1 <sup>st</sup>	3. 9 Explain and state Methods of starting and different types of starters
	2 <sup>nd</sup>	3. 10 Explain speed control by Voltage Control, Rotor resistance control, pole changing, frequency control methods.
	3 <sup>rd</sup>	3. 11 Describe plugging applicable to three phase induction motor
	4 <sup>th</sup>	3. 12 Describe different types of motor enclosures
10 <sup>th</sup>	1 <sup>st</sup>	3. 13 Explain principle of Induction Generator and state its applications
	2 <sup>nd</sup>	<b>Unit-4:SINGLE PHASE INDUCTION MOTOR.</b> 4.1 Explain Rotating – field theory of 1-phase induction motor.
	3 <sup>rd</sup>	4.2 Explain Ferrari's principle.
	4 <sup>th</sup>	4.3 Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors 4.3.1 Split phase motor.
11 <sup>th</sup>	1 <sup>st</sup>	4.3.2 Capacitor Start motor.
	2 <sup>nd</sup>	4.3.3 Capacitor start, capacitor run motor
	3 <sup>rd</sup>	4.3.4 Permanent capacitor type motor
	4 <sup>th</sup>	4.3.5 Shaded pole motor
12 <sup>th</sup>	1 <sup>st</sup>	4.4 Explain the method to change the direction of rotation of above motors
	2 <sup>nd</sup>	<b>Unit-5:COMMUTATOR MOTORS</b> 5.1 Explain construction, working principle, running characteristic and application of singlephase series motor (contd.)
	3 <sup>rd</sup>	5.1 Explain construction, working principle, running characteristic and application of singlephase series motor.

	4 <sup>th</sup>	5.2 Explain construction, working principle and application of Universal motors. (contd.)
13 <sup>th</sup>	1 <sup>st</sup>	5.2 Explain construction, working principle and application of Universal motors.
	2 <sup>nd</sup>	5.3 Explain working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.(cont..)
	3 <sup>rd</sup>	5.3 Explain working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.
	4 <sup>th</sup>	<b>Unit-6:SPECIAL ELECTRICAL MACHINE</b> 6.1 Principle of Stepper motor.
14 <sup>th</sup>	1 <sup>st</sup>	6.2 Classification of Stepper motor. 6.3 Principle of variable reluctant stepper motor.
	2 <sup>nd</sup>	6.4 Principle of Permanent magnet stepper motor.
	3 <sup>rd</sup>	6.5 Principle of hybrid stepper motor.
	4 <sup>th</sup>	6.6 Applications of Stepper motor.
15 <sup>th</sup>	1 <sup>st</sup>	<b>Unit-7: THREE PHASE TRANSFORMERS</b> 7.1 Explain Grouping of winding, Advantages
	2 <sup>nd</sup>	7.2 Explain parallel operation of the three phase transformers.
	3 <sup>rd</sup>	7.3 Explain tap changer (On/Off load tap changing
	4 <sup>th</sup>	7.4 State maintenance of Transformers

Anil Kumar Prisaji

Signature of Teaching Faculty

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