



**ACADEMIC LESSON PLAN FOR SESSION-2021-22**  
**DEPT. OF ELECTRICAL ENGG, GOVT. POLYTECHNIC, BALASORE.**  
**NAME OF THE FACULTY: ANITA SHIAL [Lect. (EE)]**  
**ENERGY CONVERSION-II**

Course Code : TH-2

Theory : 4 P/W

Total Period s: 60 P/ Sem

Examination: 3 Hours

Sem : 5TH EE

Class Test : 20 Marks

End Semester Exam : 80 marks

TOTAL MARKS : 100 Marks

Start : 1<sup>ST</sup> October 2021

WEEK	PERIOD	TOPIC
1st	1 <sup>st</sup>	Explain and derive production of rotating magnetic field.
	2 <sup>nd</sup>	Explain constructional feature of Squirrel cage and Slip ring induction motors
	3 <sup>rd</sup>	Explain principles of operation of 3-phase Induction motor.
	4 <sup>th</sup>	Explain slip speed, slip and slip relation with rotor quantities.
2 <sup>nd</sup>	1 <sup>st</sup>	Derive Torque during starting and running and conditions for maximum torque.
	2 <sup>nd</sup>	Solved numerical problems
	3 <sup>rd</sup>	Derive Torque-slip characteristics.
	4 <sup>th</sup>	Derive relation between full load torque and starting torque etc. (solve numerical problems)
3 <sup>rd</sup>	1 <sup>st</sup>	Determine the relations between Rotor Copper loss, Rotor output and Gross Torque, and relationship of slip with rotor copper loss.
	2 <sup>nd</sup>	Explain and state Methods of starting and different types of starters.
	3 <sup>rd</sup>	Explain speed control by Voltage Control, Rotor resistance control, pole changing, frequency control methods.
	4 <sup>th</sup>	Describe plugging applicable to three phase induction motor.
4 <sup>th</sup>	1 <sup>st</sup>	Describe different types of motor enclosures.
	2 <sup>nd</sup>	Explain principle of Induction Generator and state its applications.
	3 <sup>rd</sup>	State types of alternator and their constructional features.
	4 <sup>th</sup>	Explain working principle of alternator and establish the relation between speed and frequency
5 <sup>th</sup>	1 <sup>st</sup>	Explain terminology in armature winding, and derive expressions for winding factors (Pitch factor, Distribution factor)
	2 <sup>nd</sup>	Explain harmonics, its causes and impact on winding factor.

	3 <sup>rd</sup>	Derive E.M.F equation.
	4 <sup>th</sup>	Solve numerical problems
6 <sup>th</sup>	1 <sup>st</sup>	Explain Armature reaction and its effect on emf at different pf of load.
	2 <sup>nd</sup>	Draw the vector diagram of loaded alternator. (Solve numerical problems)
	3 <sup>rd</sup>	State and explain testing of alternator (open circuit and short circuit methods)
	4 <sup>th</sup>	Solve numerical problems
7 <sup>th</sup>	1 <sup>st</sup>	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method.
	2 <sup>nd</sup>	Explain parallel operation of alternator using synchroscope, dark and bright lamp method.
	3 <sup>rd</sup>	Explain distribution of load by parallel connected alternators.
	4 <sup>th</sup>	Explain constructional feature of Synchronous Motor.
8 <sup>th</sup>	1 <sup>st</sup>	Explain principles of operation, concept of load angle.
	2 <sup>nd</sup>	Explain effect of varying load with constant excitation.
	3 <sup>rd</sup>	Explain effect of varying excitation with constant load.
	4 <sup>th</sup>	Derive torque, power developed
9 <sup>th</sup>	1 <sup>st</sup>	Explain power angle characteristics of cylindrical rotor motor.
	2 <sup>nd</sup>	Explain effect of excitation on Armature current and power factor. Explain Hunting & function of Damper Bars.
	3 <sup>rd</sup>	Describe method of starting of Synchronous motor. State application of synchronous motor.
	4 <sup>th</sup>	Explain Rotating – field theory of 1-phase induction motor.
10 <sup>th</sup>	1 <sup>st</sup>	Explain Ferrari's principle.
	2 <sup>nd</sup>	Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors.
	3 <sup>rd</sup>	Split phase motor. Capacitor Start motor.
	4 <sup>th</sup>	Capacitor start, capacitor run motor Permanent capacitor type motor
11 <sup>th</sup>	1 <sup>st</sup>	Shaded pole motor.
	2 <sup>nd</sup>	Explain the method to change the direction of rotation of above motors
	3 <sup>rd</sup>	Tutorial
	4 <sup>th</sup>	Explain construction, working principle of 1 phase series motor.
12 <sup>th</sup>	1 <sup>st</sup>	Running characteristic and application of single phase series motor.
	2 <sup>nd</sup>	Explain construction, working principle and application of Universal motors.
	3 <sup>rd</sup>	Explain working principle of Repulsion start Motor, ,
	4 <sup>th</sup>	Repulsion start Induction run motor.

13 <sup>th</sup>	1 <sup>st</sup>	Repulsion Induction motor.
	2 <sup>nd</sup>	Principle of Stepper motor.
	3 <sup>rd</sup>	Classification of Stepper motor.
	4 <sup>th</sup>	Principle of variable reluctant stepper motor.
14 <sup>th</sup>	1 <sup>st</sup>	Principle of Permanent magnet stepper motor.
	2 <sup>nd</sup>	Principle of hybrid stepper motor. Applications of Stepper motor.
	3 <sup>rd</sup>	Explain Grouping of winding, Advantages.
	4 <sup>th</sup>	Explain parallel operation of the three phase transformers.
15 <sup>th</sup>	1 <sup>st</sup>	Explain tap changer (On/Off load tap changing)
	2 <sup>nd</sup>	State maintenance of Transformers.
	3 <sup>rd</sup>	Tutorial
	4 <sup>th</sup>	Tutorial