

LESSON PLAN

- 1) **Subject Code:** Th.1
- 2) **Subject Title:** Entrepreneurship and Management & Smart Technology
- 3) **Semester:** 5th
- 4) **Branch:** Electrical Engg.
- 5) **Faculty:** Shitendra Ku. Baliarsingh
- 6) **No. of Classes / Week:** 3
- 7) **Pre Requisite for the Subject:** NIL / YES, If YES, give details:
- 8) **Text Book to be referred by students:**

SI No.	Book	Author	Publication	% of Questions Asked	Year (Edition)	Whether available in Library
i	Entrepreneurship and Management & Smart Technology	B. BADHAI	Dhanpat Rai and Sons	90	2007	Yes

9) Course Coverage Schedule

Ch. No.	Name of the Chapter	Course to be Covered	No of periods Required	Total Class for Chapter/ Week (From-To)	Remark
01	ENTREPRENEURSHIP	1.1 Concept / Meaning of Entrepreneurship	01	05 Week(1-2)	
		1.2 Need of Entrepreneurship			
		1.3 Characteristics, Qualities and Types of entrepreneur, Functions	01		
		1.4 Barriers in entrepreneurship			
		1.5 Entrepreneurs vrs. Manager	01		
		1.6 Forms of Business Ownership: Sole proprietorship, partnership forms and others			
02	MARKET SURVEY AND OPPORTUNITY IDENTIFICATION (BUSINESS PLANNING)	1.7 Types of Industries, Concept of Start-ups	01	03 Week-(2-3)	
		1.8 Entrepreneurial support agencies at National, State, District Level (Sources): DIC, NSIC, OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.	01		
		1.9 Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks			
		1001 Topic End			
		2.1 Business Planning	01		
03	PROJECT REPORT PREPARATION	2.2 SSI, Ancillary Units, Tiny Units, Service sector Units		02 Week-(3-4)	
		2.3 Time schedule Plan, Agencies to be contacted for Project Implementation	01		
		2.4 Assessment of Demand and supply and Potential areas of Growth			
		2.5 Identifying Business Opportunity	01		
04	MANAGEMENT PRINCIPLES	2.6 Final Product selection		03 Week-(4-5)	
		1002 Topic End			
		3.1 Preliminary project report	01		
		3.2 Detailed project report, Technoeconomic Feasibility	01		
05	FUNCTIONAL AREAS OF MANAGEMENT	3.3 Project Viability		06 Week-(5-6-7)	
		1003 Topic End			
		4.1 Definitions of management	01		
		4.2 Principles of management			
		4.3 Functions of management (planning, organising, staffing, directing and controlling etc.)	01		
		4.4 Level of Management in an Organisation	01		
		1004 Topic End			
		5.1 Production management			
		5.1.1 Functions, Activities	01		
		5.1.2 Productivity			
		5.1.3 Quality control			
		5.1.4 Production Planning and control			
		5.2 Inventory Management	01		
		5.2.1 Need for Inventory management			
		5.2.2 Models/Techniques of Inventory management			

		5.3 Financial Management 5.3.1 Functions of Financial management 5.3.2 Management of Working capital 5.3.3 Costing (only concept)	01		
		5.3.4 Break even Analysis 5.3.5 Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)	01		
		5.4 Marketing Management 5.4.1 Concept of Marketing and Marketing Management 5.4.2 Marketing Techniques (only concepts) 5.4.3 Concept of 4P s (Price, Place, Product, Promotion)	01		
		5.5 Human Resource Management 5.5.1 Functions of Personnel Management 5.5.2 Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages	01		
		1005 Topic End			
06	LEADERSHIP AND MOTIVATION	6.1 Leadership 6.1.1 Definition and Need/Importance 6.1.2 Qualities and functions of a leader 6.1.3 Manager Vs Leader 6.1.4 Style of Leadership (Autocratic, Democratic, Participative)	01	03 Week-(7-8)	
		6.2 Motivation 6.2.1 Definition and characteristics 6.2.2 Importance of motivation 6.2.3 Factors affecting motivation	01		
		6.2.4 Theories of motivation (Maslow) 6.2.5 Methods of Improving Motivation 6.2.6 Importance of Communication in Business 6.2.7 Types and Barriers of Communication	01		
		1006 Topic End			
07	WORK CULTURE, TQM & SAFETY	7.1 Human relationship and Performance in Organization 7.2 Relations with Peers, Superiors and Subordinates 7.3 TQM concepts: Quality Policy, Quality Management, Quality system 7.4 Accidents and Safety, Cause, preventive measures, General Safety Rules, Personal Protection Equipment (PPE)	01 01		02 Week-8
		1007 Topic End			
08	LEGISLATION	8.1 Intellectual Property Rights (IPR), Patents, Trademarks, Copyrights 8.2 Features of Factories Act 1948 with Amendment (only salient points) c) 8.3 Features of Payment of Wages Act 1936 (only salient points)	01 01	02 Week -9	
		1008 Topic End			
09	SMART TECHNOLOGY	9.1 Concept of IOT, How IOT works 9.2 Components of IOT, Characteristics of IOT, Categories of IOT 9.3 Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc	01 01 02	04 Week(9-10)	
		1009 Topic End			

S. Balasubrahmanyam
Faculty

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Principal

LESSON PLAN

- 1) Subject Code: TH.2
- 2) Subject Title: ENERGY CONVERSION – II
- 3) Semester: 5th
- 4) Branch: Electrical Engg.
- 5) Faculty: Priyabrata Mohapatra
- 6) No. of Classes / Week: 4P/Week
- 7) Pre Requisite for the Subject: NIL / YES, If YES, give details:
- 8) Text Book to be referred by students:

Sl. No.	Book	Author	Publication	% of Questions Asked	Year (Edition)	Whether available in Library
i	Electrical Technology – II	B. L. Theraja and A. K. Theraja	S.Chand	90%		Yes

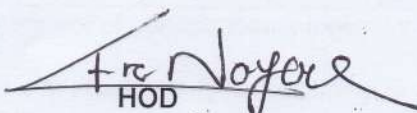
9) Course Coverage Schedule:

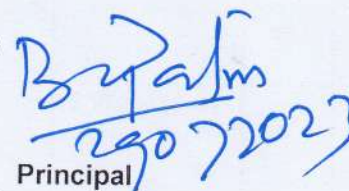
Ch. No.	Name of Chapter	Course to be Covered	No of periods Required	Total Class for Chapter/ Week (From-To)	Remarks
1.	ALTERNATOR	1.1. Types of alternator and their constructional features.	1	11Week (1-2-3)	
		1.2. Basic working principle of alternator and the relation between speed and frequency.).	1		
		1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor	1		
		1.4. Explain harmonics, its causes and impact on winding factor.	1		
		1.5. E.M.F equation of alternator. (Solve numerical problems).	1		
		1.6. Explain Armature reaction and its effect on emf at different power factor of load.	1		
		1.7. The vector diagram of loaded alternator. (Solve numerical problems)	1		
		1.8. Testing of alternator (Solve numerical problems) 1.8.1. Open circuit test. 1.8.2. Short circuit test.	1		
		1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems).	1		
		1.10. Parallel operation of alternator using synchro-scope and dark & bright lamp method	1		
		1.11. Explain distribution of load by parallel connected alternators	1		

2.	SYNCHRONOUS MOTOR	2.1. Constructional feature of Synchronous Motor.	1	10 Week (3-4-5-6)	
		2.2. Principles of operation, concept of load angle	1		
		2.3. Derive torque, power developed.	1		
		2.4. Effect of varying load with constant excitation..	1		
		2.5. Effect of varying excitation with constant load	1		
		2.6. Power angle characteristics of cylindrical rotor motor..	1		
		2.7. Explain effect of excitation on Armature current and power factor	1		
		2.8. Hunting in Synchronous Motor.	1		
		2.9. Function of Damper Bars in synchronous motor and generator..	1		
		2.10. Describe method of starting of Synchronous motor	1		
		2.11. State application of synchronous moto			
3.	THREE PHASE INDUCTION MOTOR	3.1. Production of rotating magnetic field.	1	11 Week (6-7-8)	
		3.2. Constructional feature of Squirrel cage and Slip ring induction motors	1		
		3.3. Working principles of operation of 3-phase Induction motor.	1		
		3.4. Define slip speed, slip and establish the relation of slip with rotor quantities.	1		
		3.5. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)	2		
		3.6. Torque-slip characteristics	2		
		3.7. Derive relation between full load torque and starting torque etc. (solve numerical problems)			
		3.8. Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems)	1		
		3.9. Methods of starting and different types of starters used for three phase Induction motor.	1		
		3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.			
		3.11. Plugging as applicable to three phase induction motor	1		
		3.12. Describe different types of motor enclosures			
		3.13. Explain principle of Induction Generator and state its applications.			

4	SINGLE PHASE INDUCTION MOTOR	4.1. Explain Ferrari's principle. 4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor. 4.3. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors. 4.3.1. Split phase motor 4.3.2. Capacitor Start motor..	1	2 Week (9)	
		4.3.3. Capacitor start, capacitor run motor. 4.3.4. Permanent capacitor type motor. 4.3.5. Shaded pole motor. 4.4. Explain the method to change the direction of rotation of above motors	1		
5	COMMUTATOR MOTORS	5.1. Construction, working principle, running characteristic and application of single phase series motor. 5.2. Construction, working principle and application of Universal motors	1	2 Week (9)	
		5.3. Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.	1		
6	SPECIAL ELECTRICAL MACHINE	6.1. Principle of Stepper motor. 6.2. Classification of Stepper motor. 6.3. Principle of variable reluctant stepper motor.	1	2 Week (10)	
		6.4. Principle of Permanent magnet stepper motor 6.5. Principle of hybrid stepper motor. 6.6. Applications of Stepper motor.	1		
7	THREE PHASE TRANSFORMERS	7.1. Explain Grouping of winding, Advantages. 7.2. Explain parallel operation of the three phase transformers.	1	2 Week (10)	
		7.3. Explain tap changer (On/Off load tap changing) 7.4. Maintenance Schedule of Power Transformers	1		

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LESSON PLAN

- 1) Subject Code: Th-3 2) Subject Title: DIGITAL ELECTRONICS & MICROPROCESSOR
 3) Semester: 5TH 4) Branch: Electrical Engg.
 5) Faculty: Sibanika Panda
 6) No. of Classes / Week: 3P/week
 7) Pre Requisite for the Subject: NIL / YES, If YES, give details:
 8) Text Book to be referred by students:

Sl No.	Book	Author	Publication	% of Questions Asked	Year (Edition)	Whether available in Library
i	Fundamentals of digital circuits	A. Anand Kumar	PHI	80%	2010	YES
ii	Microprocessors & microcontrollers	S.K.Mandal	TM Graw Hill	80%	2011	YES

9) **Course Coverage Schedule:**

Ch. No.	Name of Chapter	Course to be Covered	No of periods Required	Total Class for Chapter/ Week (From-To)	Remarks
1.	BASICS OF DIGITAL ELECTRONICS	1.1 Binary, Octal, Hexadecimal number systems and compare with Decimal system.	2	8 Week(1,2,3)	
		1.2 Binary addition, subtraction, Multiplication and Division.			
		1.3 1's complement and 2's complement numbers for a binary number	1		
		1.4 Subtraction of binary numbers in 2's complement method.			
		1.5 Use of weighted and Un-weighted codes & write Binary equivalent number for a number in 8421, Excess-3 and Gray Code and vice-versa.	1		
		1.6 Importance of parity Bit.			
		1.7 Logic Gates: AND, OR, NOT, NAND, NOR and EX-OR gates with truth table.	1		
2.	COMBINATIONAL LOGIC CIRCUITS	1.8 Realize AND, OR, NOT operations using NAND, NOR gates.		5 Week(3,4)	
		1.9 Different postulates and De-Morgan's theorems in Boolean algebra.	1		
		1.10 Use Of Boolean Algebra For Simplification Of Logic Expression			
		1.11 Karnaugh Map For 2,3,4 Variable, Simplification Of SOP And POS Logic Expression Using K-Map.	2		
		2.1 Give the concept of combinational logic circuits.	1		
		2.2 Half adder circuit and verify its functionality using truth table.			
		2.3 Realize a Half-adder using NAND gates only and NOR gates only.	1		
		2.4 Full adder circuit and explain its operation with truth table.	1		
		2.5 Realize full-adder using two Half-adders and an OR – gate and write truth table			
		2.6 Full subtractor circuit and explain its	1		

		operation with truth table. 2.7 Operation of 4 X 1 Multiplexers and 1 X 4 demultiplexer			
		2.8 Working of Binary-Decimal Encoder & 3 X 8 Decoder. 2.9 Working of Two bit magnitude comparator	1		
3.	SEQUENTIAL LOGIC CIRCUITS	3.1 Give the idea of Sequential logic circuits. 3.2 State the necessity of clock and give the concept of level clocking and edge triggering, 3.3 Clocked SR flip flop with preset and clear inputs.	1	5 Week (5-6)	
		3.5 Construct level clocked JK flip flop using S-R flip-flop and explain with truth table 3.6 Concept of race around condition and study of master slave JK flip flop. 3.7 Give the truth tables of edge triggered D and T flip flops and draw their symbols	1		
		3.8 Applications of flip flops. 3.9 Define modulus of a counter 3.10 4-bit asynchronous counter and its timing diagram.	1		
		3.11 Asynchronous decade counter. 3.12 4-bit synchronous counter. 3.13 Distinguish between synchronous and asynchronous counters.	1		
		3.14 State the need for a Register and list the four types of registers. 3.15 Working of SISO, SIPO, PISO, PIPO Register with truth table using flip flop.	1		
4.	8085 MICROPROCESSOR	4.1 Introduction to Microprocessors, Microcomputers 4.2 Architecture of Intel 8085A Microprocessor and description of each block. 4.3 Pin diagram and description. 4.4 Stack, Stack pointer & stack top	1 2	9 Week (6,7,8-9)	
		4.5 Interrupts 4.6 Opcode & Operand, 4.7 Differentiate between one byte, two byte & three byte instruction with example.	1		
		4.8 Instruction set of 8085 example	1		
		4.9 Addressing mode 4.10 Fetch Cycle, Machine Cycle, Instruction Cycle, T-State	1		
		4.11 Timing Diagram for memory read, memory write, I/O read, I/O write 4.12 Timing Diagram for 8085 instruction	1		
		4.13 Counter and time delay. 4.14 Simple assembly language programming of 8085.	2		
5.	INTERFACING AND SUPPORT CHIPS	5.1 Basic Interfacing Concepts, Memory mapping & I/O mapping 5.2 Functional block diagram and description of each block of Programmable peripheral interface Intel 8255	1	3 Week(9-10)	
		5.3 Application using 8255: Seven segment LED display, Square wave generator, Traffic light Controller	2		

Samala
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Frederic Noya
HOD
17.7.23

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24.07.2023
Principal

LESSON PLAN

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|---|---|
| 1) Subject Code: Th.4
3) Semester: 5TH
5) Faculty: Prngyamayee Mahapatra
6) No. of Classes / Week: 04
7) Pre Requisite for the Subject: NIL
8) Text Book to be referred by students: | 2) Subject : Utilization of Electrical Energy & Traction
4) Branch: ELECTRICAL ENGG. |
|---|---|

SI No.	Book	Author	Publication	% of Questions Asked	Year (Edition)	Whether available in Library
1	<i>Utilization of Electrical Energy by Traction</i>	G. C. Garg	Khanna Publisher	80	2009	YES

9) Course Coverage Schedule:

Ch. No.	Name of Chapter	Course to be Covered	No of periods Required	Total Class for Chapter/ Week (From-To)	Remarks
01	ELECTROLYTIC PROCESS	1.1. Definition and Basic principle of Electro Deposition.	01		
		1.2. Important terms regarding electrolysis			
		1.3. Faradays Laws of Electrolysis	01		
		1.4. Definitions of current efficiency, Energy efficiency.	01		
		1.5. Principle of Electro Deposition			
		1.6. Factors affecting the amount of Electro Deposition	01		
		1.7. Factors governing the electro deposition			
		1.8. State simple example of extraction of metals.	01		
		1.9. Application of Electrolysis	01		
02	ELECTRICAL HEATING	2.1. Advantages of electrical heating.	01		
		2.2. Mode of heat transfer and Stephen’s Law.			
		2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)	01		
		2.4. Discuss working principle of direct arc furnace and indirect arc furnace	01		
		2.5. Principle of Induction heating. 2.5.1. Working principle of direct core type, vertical core type and indirect core type Induction furnace. 2.5.2. Principle of coreless induction furnace and skin effect.	02		
		2.6. Principle of dielectric heating and its application.	01		
		2.7. Principle of Microwave heating and its application	01		
		03	PRINCIPLES OF ARC WELDING		
3.2. Discuss D. C. & A. C. Arc phenomena.					
3.3. D.C. & A. C. arc welding plants of single and multi-operation type	01				
3.4. Types of arc welding	01				
3.5. Explain principles of resistance welding	01				
3.6. Descriptive study of different resistance welding methods	01				

04	ILLUMINATION	4.1. Nature of Radiation and its spectrum.	01		
		4.2. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]			
		4.3. Explain the inverse square law and the cosine law.	01		
		4.4. Explain polar curves	01		
		4.5. Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors			
		4.6. Design simple lighting schemes and depreciation factor	01		
		4.7. Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.	01		
		4.8. Explain Discharge lamps.	01		
		4.9. State Basic idea about excitation in gas discharge lamps	01		
		4.10. State constructional features and operation of Fluorescent lamp. (PL and PLL Lamps)	01		
		4.11. Sodium vapor lamps.	01		
		4.12. High pressure mercury vapor lamps			
		4.13. Neon sign lamps	01		
		4.14. High lumen output & low consumption fluorescent lamps			
05	INDUSTRIAL DRIVES	5.1. State group and individual drive.	01		
		5.2. Method of choice of electric drives	01		
		5.3. Explain starting and running characteristics of DC and AC motor	01		
		5.4. State Application of:	02		
		5.4.1. DC motor. 5.4.2. 3-phase induction motor. 5.4.3. 3 phase synchronous motors. 5.4.4. Single phase induction, series motor, universal motor and repulsion motor			
06	ELECTRIC TRACTION	6.1. Explain system of traction.	01		
		6.2. System of Track electrification	01		
		6.3. Running Characteristics of DC and AC traction motor	01		
		6.4. Explain control of motor:	02		
		6.4.1. Tapped field control. 6.4.2. Rheostatic control. 6.4.3. Series parallel control. 6.4.4. Multi-unit control. 6.4.5. Metadyne control			
		6.5. Explain Braking of the following types:	02		
		6.5.1. Regenerative Braking. 6.5.2. Braking with 1-phase series motor. 6.5.3. Magnetic Braking			

Prakash Kumar
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Preraj Kumar
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Prakash Kumar
28/07/2023
Principal

LESSON PLAN

- 1) Subject Code: Theory 05

3) Semester : 5th

5) Faculty: Arun Ranjan Nayak

6) No. Of Classes / Week : 04

7) Pre Requisite For The Subject:
 NIL / YES, If YES, Give Details: Basic knowledge about Diode, Transistor, Resistor, Biasing, AC & DC motor characteristics etc must required before study about power electronics.

8) Text Book To Be Referred By Students:

2) Subject Title: Power Electronics & PLC

4) Branch: Electrical

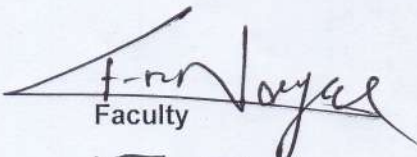
Sl No.	Book	Author	Publication	% of question asked in exam	Year (Edition)	Whether available in Library
i	POWER ELECTRONICS	Dr. P.S. Bimbhra	Khanna Publishers	90%	Fourth Edition (2008)	Available
ii	POWER ELECTRONICS	M.D. Singh & K.B. Khanchandani	Tata McGraw-Hill Education	90%	2 nd Edition 2017	Available
iii	Programmable logic controller	Frank D. Petruzela	Tata McGraw Hill Education	30%	5 th Edition 2019	Available

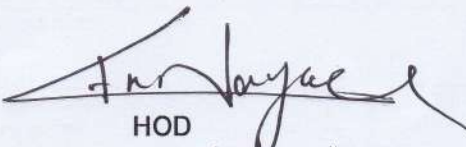
9) Course Coverage Schedule:

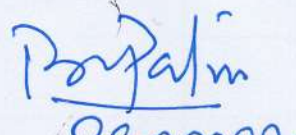
Ch. No.	Name of Chapter	Course to be Covered	No of Periods Required	Total Class for Chapter/ Week (From-To)	Remarks
01	UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT	03	09 From Week 01 To Week 03	
		1.2 Two transistor analogy of SCR. 1.3 Gate characteristics of SCR.	02		
		1.4 Switching characteristic of SCR during turn on and turn off. 1.5 Turn on methods of SCR.			
		1.6 Turn off methods of SCR (Line commutation and Forced commutation) Load Commutation Resonant pulse commutation	01		
		1.7 Voltage and Current ratings of SCR 1.8 Protection of SCR 1.8.1 Over voltage protection 1.8.2 Over current protection 1.8.3 Gate protection 1.9 Firing Circuits General layout diagram of firing circuit R firing circuits R-C firing circuit	02		

		UJT pulse trigger circuit 1.10 Synchronous triggering (Ramp Triggering Design of Snubber Circuits 1001 End Article	01		
02	UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.	2.1 Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter . 2.2 Two quadrant full converter and dual Converter	01	08 Week 03 To week 04	
		2.3 Working of single-phase half wave controlled converter with Resistive and R-L loads. 2.4 Understand need of freewheeling diode.	04		
		2.5 Working of single phase fully controlled converter with resistive and R- L loads. 2.6 Working of three-phase half wave controlled converter with Resistive load 2.7 Working of single phase AC regulator .	03		
		2.8 Working principle of step up & step down chopper 2.9 Control modes of chopper Control modes of chopper 2.10 Operation of chopper in all four quadrants 1002 End Article			
03	UNDERSTAND THE INVERTERS AND CYCLOCONVERTERS .	3.1 Classify inverters. 3.2 Explain the working of series inverter Explain the working of parallel inverter	02	06 Week 05 To Week 06	
		3.3 Explain the working of single-phase bridge inverter. 3.4 Explain the basic principle of Cyclo-converter	02		
		3.5 Explain the working of single-phase step up & step down Cyclo-converter. 3.6 Applications of Cyclo-converter . 1003 End Article	02		
04	. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS	4.1 List applications of power electronic circuits. 4.2 List the factors affecting the speed of DC Motors 4.3 Speed control for DC Shunt motor using converter 4.4 Speed control for DC Shunt motor using chopper 4.5 List the factors affecting speed of the AC Motors.	04	08 Week 06 To Week 07 & Week 08	
		4.6 Speed control of Induction Motor by using AC voltage regulator . 4.7 Speed control of induction motor by using converters and inverters (V/F control .	02		

		4.8 Working of UPS with block diagram. 4.9 Battery charger circuit using SCR with the help of a diagram. 4.10 Basic Switched mode power supply (SMPS) - explain its working & applications 1004 End Article	02		
05	PLC AND ITS APPLICATIONS	5.1 Introduction of Programmable Logic Controller(PLC) 5.2 Advantages of PLC 5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC . 5.4 Applications of PLC 5.5 Ladder diagram 5.6 Description of contacts and coils in the following states i) Normally open ii) Normally closed iii) Energized output iv) latched Output v) branching 5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate	04	09	
		5.8 Ladder diagrams for combination circuits using NAND, NOR, AND, OR and NOT 5.9 Timers-i) T ON ii) T OFF and iii) Retentive timer . 5.10 Counters-CTU, CTD 5.11 Ladder diagrams using Timers and counters . 5.12 PLC Instruction set 5.13 Ladder diagrams for following (i) DOL starter and (ii) STAR-DELTA starter . iii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller iv) Temperature Controller .	05		
		5.14 Special control systems- Basics DCS & SCADA systems . 5.15 Computer Control-Data Acquisition, Direct Digital Control System (Basics only) 1005 End Article		Week 08 To Week 09	
				Week 09 To Week 10	


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