ACADEMIC LESSON PLAN OF WINTER 2023

Discipline: Electrical engineering	Semester : 5TH	No. of periods available: 51	Name of Teaching Faculty:
Subject: Entrepreneurship and Management & Smart Technology(TH1)	No. of Days/ per week class allotted : 4 periods per week		No. of weeks : 13
Week	Class Day		Topics to be covered
1st	1st	1	Concept /Meaning of entrepreneurship and Need of Entrepreneurship
	2nd	1	Characteristics, Qualities and Types of entrepreneur
	3rd	1	Functions and Barriers in entrepreneurship
	4th	1	Entrepreneurs vs Manager Forms of Business Ownership: Sole proprietorship
2nd	5th	1	Partnership forms, Cooperative society business
	6th	1	joint Hindu family business , joint stock company
	7th	1	types of Industries, Concept of Start-ups
	8th	1	Entrepreneurial support agencies at National, State, DistrictLevel(Sources): DIC, NSIC,OSIC, SIDBI
3rd	9th	1	NABARD, Commercial Banks, KVIC etc.
	10th	1	Technology Business Incubators (TBI) and Science andTechnology Entrepreneur Parks
	11th	1	Business Planning, SSI, Ancillary Units, Tiny Units, Service Sector
	12th	1	Units

4th	13th	1	Time schedule Plan, Agencies to be contacted for ProjectImplementation
	14th	1	Assessment of Demand and supply, Potential areas of Growth
	15th	1	Identifying Business Opportunity
	16th	1	Final Product selection
5th	17th	1	Preliminary project report
	18th	1	Detailed project report
	19th	1	Techno economic Feasibility, Project Viability
	20th	1	Definitions of management ,Principles of management
6th	21st	1	Functions of management : planning
	22nd	1	organizing , Staffing
	23rd	1	directing and controlling
	24th	1	Level of Management in an Organization
7th	25th	1	**Quiz test**
	26th	1	Production management :Functions, Activities andProductivity, Quality control
	27th	1	Production Planning and control, Inventory Management
	28th	1	Need for Inventory management .Models/Techniques of Inventory management
8th	29th	1	Financial Management :Functions of Financial management,management of Working capital
	30th	1	Costing (only concept),Break even Analysis,
	31st	1	Brief idea about Accounting Terminologies: Book Keeping,Journal entry, Petty Cash book
	32nd	1	P&L Accounts, Balance Sheets(only Concepts)
9th	33rd	1	Marketing Management : Concept of Marketing and MarketingManagement

	34th	1	Marketing Techniques (only concepts) Concept of 4P s (Price,Place, Product, Promotion)
	35th	1	Human Resource Management : Functions of Personnel Management, Manpower Planning,
	36th	1	Recruitment, Sources of manpower, Selection process
10th	37th	1	Method of Testing, Methods of Training & Development, Payment of Wages
	38th	1	Leadership: Definition and Need/Importance qualities of aleader
	39th	1	Leadership: qualities of a leader
	40	1	Functions of a leader and Manager Vs Leader
11th	41st	1	Style of Leadership (Autocratic, Democratic, Participative)
	42nd	1	Motivation : Definition and characteristics and Importance ofmotivation
	43rd	1	Factors affecting motivation and Theories of motivation(Maslow)
	44th	1	Methods of Improving Motivation, Importance of Communication in Business, Types and Barriers of Communication
12th	45th	1	Work Culture, TQM & Safety :Human relationship and Performance in Organization, Relations with Peers, Superiors and Subordinates
	46th	1	TQM concepts: Quality Policy, Quality Management
	47th	1	Quality system, Accidents and Safety, Causes of accident

	48th	1	Preventive measures, General Safety Rules ,
			Personal Protection Equipment(PPE)
13th	49th	1	Legislation: Intellectual Property Rights(IPR) ,Patents, Trademarks and copyrights
	50th	1	Features of Factories Act 1948 with Amendment (onlysalient points) ,Features of Payment of Wages Act 1936 (only salient points)
	51st	1	Smart Technology : Concept of IOT, How IOT works
	52nd	1	Components of IOT, Characteristics of IOT, Categories of IOT Applications of IOT: Smart Cities, Smart Transportation, Smart Home Smart Healthcare, Smart industry, Smart Agriculture, Smart Energy Management etc

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF WINTER 2023

Discipline: ELECTRICAL	Semester: 5TH Sem	Name of the Teaching Faculty: SANGRAM KESARI NAYAK
Subject: ENERGY CONVERSION–II(TH2)	No. of days/per week class allotted: 4p/week	Semester From: 1st Aug 2023 to 30th Nov 2023 No. of Weeks: 17 weeks
1st	1st	**Unit-1:ALTERNATOR** 1.1 Types of alternator and their constructional features
	2nd	1.2 Basic working principle of alternator and establish the relation between speed and frequency
	3rd	1.3 Explain terminology in armature winding, and derive expressions for winding factors (Pitch factor, Distribution factor).
	4th	1.4 Explain harmonics, its causes and impact on winding factor.
2nd	1st	1.5 Derive E.M.F equation. (Solve numerical problems (contd.)
	2nd	1.5 Derive E.M.F equation. (Solve numerical problems
	3rd	1.6 Explain Armature reaction and its effect on emf at different pf of load (contd.)
	4th	1.6 Explain Armature reaction and its effect on emf at different pf of load.
3rd	1st	1.7 Draw the vector diagram of loaded alternator. (Solve numerical problems)
	2nd	1.8 State and explain testing of alternator (open circuit and short circuit methods) (Solve numerical problems).(contd.)
	3rd	1.8 State and explain testing of alternator (open circuit and short circuit methods) (Solve numerical problems).
	4th	1.9 Determination of voltage regulation of Alternator by direct loading and synchronous impedance method
4th	1st	1.10 Explain parallel operation of alternator using synchro-scope, dark and bright lamp method
	2nd	1.11 Explain distribution of load by parallel connected alternators
	3rd	**Unit-2:SYNCHRONOUS MOTOR** 2.1 Explain constructional feature of Synchronous Motor. 2.2 Explain principles of operation, concept of load angle.
	4th	2.3 Explain effect of varying load with constant excitation(cont..)
5th	1st	2.3 Explain effect of varying load with constant excitation
	2nd	2.4 Explain effect of varying excitation with constant load.
	3rd	2.5 Derive torque, power developed(cont..)
	4th	2.5 Derive torque, power developed. 2.6 Explain power angle characteristics of cylindrical rotor motor.
6th	1st	2.7 Explain effect of excitation on Armature current and power factor. 2.8 Explain Hunting & function of Damper Bars.
	2nd	2.9 Describe method of starting of Synchronous motor.(cont..)
	3rd	2.9 Describe method of starting of Synchronous motor. 2.10 State application of synchronous motor
	4th	**Unit-3: THREE PHASE INDUCTION MOTOR** 3. 1 Explain and derive production of rotating magnetic field.
7th	1st	3. 2 Explain constructional feature of Squirrel cage and Slip ring induction motor.
	2nd	3. 3 Explain principles of operation of 3-phase Induction motor.
	3rd	3. 4 Explain slip speed, slip and slip relation with rotor quantities
	4th	3. 5 Derive Torque during starting and running and conditions for maximum torque. (solve numerical problems) (contd.)
	1st	3. 5 Derive Torque during starting and running and conditions for maximum torque. (solve numerical problems)

8th	2nd	3. 6 Derive Torque-slip characteristics
	3rd	3. 7 Derive relation between full load torque and starting torque etc. (solve numerical problems).
	4th	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)
9th	1st	3. 9 Explain and state Methods of starting and different types of starters
	2nd	3. 10 Explain speed control by Voltage Control, Rotor resistance control, pole changing, frequency control methods.
	3rd	3. 11 Describe plugging applicable to three phase induction motor
	4th	3. 12 Describe different types of motor enclosures
10th	1st	3. 13 Explain principle of Induction Generator and state its applications
	2nd	**Unit-4:SINGLE PHASE INDUCTION MOTOR**. 4.1 Explain Rotating – field theory of 1-phase induction motor.
	3rd	4.2 Explain Ferrari's principle.
	4th	4.3 Explain Working principle, Torque speed characteristics, performance characteristics and application offollowing single phase motors 4.3.1 Split phase motor.
11th	1st	4.3.2 Capacitor Start motor.
	2nd	4.3.3 Capacitor start, capacitor run motor
	3rd	4.3.4 Permanent capacitor type motor
	4th	4.3.5 Shaded pole motor
12th	1st	4.4 Explain the method to change the direction of rotation of above motors
	2nd	**Unit-5:COMMUTATOR MOTORS** 5.1 Explain construction, working principle, running characteristic and application of singlephase series motor (contd.)
	3rd	5.1 Explain construction, working principle, running characteristic and application of singlephase series motor.
	4th	5.2 Explain construction, working principle and application of Universal motors. (contd.)
13th	1st	5.2 Explain construction, working principle and application of Universal motors.
	2nd	5.3 Explain working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.(cont..)
	3rd	5.3 Explain working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.
	4th	**Unit-6:SPECIAL ELECTRICAL MACHINE** 6.1 Principle of Stepper motor.
14th	1st	6.2 Classification of Stepper motor. 6.3 Principle of variable reluctant stepper motor.
	2nd	6.4 Principle of Permanent magnet stepper motor.
	3rd	6.5 Principle of hybrid stepper motor.
	4th	6.6 Applications of Stepper motor.
15th	1st	**Unit-7: THREE PHASE TRANSFORMERS** 7.1 Explain Grouping of winding, Advantages
	2nd	7.2 Explain parallel operation of the three phase transformers.
	3rd	7.3 Explain tap changer (On/Off load tap changing
	4th	7.4 State maintenance of Transformers
16th	1st	REVISION CLASS
	2nd	REVISION CLASS
	3rd	REVISION CLASS
	4th	REVISION CLASS
17th	1st	REVISION CLASS
	2nd	REVISION CLASS
	3rd	REVISION CLASS

	4th	REVISION CLASS
18th	1st	REVISION CLASS
	2nd	REVISION CLASS
	3rd	REVISION CLASS
	4th	REVISION CLASS
19th	1st	REVISION CLASS
	2nd	REVISION CLASS
	3rd	REVISION CLASS
	4th	REVISION CLASS

sangram kesari nayak

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF WINTER -2023

Discipline: Electrical Engg.	**Semester:** Fifth(5th)	**Name of the Faculty:** RAJESH KUMAR JENA
Subject: Digital Electronics & Microprocessor(TH 3)	**No of Days/week class** allotted: Five(5)	Semester From: 1st Aug 2023 to 30th Nov 2023 No. of Weeks: 17 weeks
WEEK	**CLASS DAY**	**THEORY TOPICS**
1st	1st	**I**ntroduction.
	2nd	Binary, Octal, Hexadecimal number systems and compare with Decimal system.
	3rd	Binary addition, subtraction, Multiplication and Division.
	4th	1‘s complement and 2‘s complement numbers for a binary number
	5th	Use of weighted and Un-weighted codes & write Binary equivalent number for a number in 8421
2nd	1st	Excess-3 and Gray Code and vice-versa.
	2nd	Importance of parity Bit.
	3rd	Logic Gates: AND, OR, NOT, NAND, NOR and EX-OR gates with truth table.
	4th	Realize AND, OR, NOT operations using NAND gates.
	5th	Realize AND, OR, NOT operations using NOR gates.
3rd	1st	Different postulates and De-Morgan‘s theorems in Boolean algebra.
	2nd	Use Of Boolean Algebra For Simplification Of Logic Expression
	3rd	Karnaugh Map For 2&3Variable,
	4th	Karnaugh Map For 4 Variable,
	5th	Simplification Of SOP And POS Logic Expression Using K-Map.
4th	1st	**Review Class**
	2nd	Give the concept of Combinational Logic circuit.
	3rd	Half adder circuit and verify its functionality using truth table.
	4th	Realize a Half-adder using NAND gates only and NOR gates only.
	5th	**Monthly Test**
5th	1st	Full adder circuit and explain its operation with truth table.
	2nd	Realize full-adder using two Half-adders and an OR – gate and write truth table
	3rd	Full subtractor circuit and explain its operation with truth table.
	4th	Operation of 4 X 1 Multiplexers and 1 X 4 DE multiplexer
	5th	Working of Binary-Decimal Encoder & 3 X 8 Decoder.
	1st	Working of Two bit magnitude comparator.
	2nd	**Review Class**

6th	3rd	Give the Idea of the Sequential Logic Circuits
	4th	State the necessity of clock and give the concept of level clocking and edge triggering,
	5th	Clocked SR flip flop with preset and clear inputs.
7th	1st	Construct level clocked JK flip flop using S-R flip-flop and explain with truth table.
	2nd	Concept of race around condition and study of master slave JK flip flop.
	3rd	Give the truth tables of edge triggered D and T flip flops and draw their symbols.
	4th	Applications of flip flops.
	5th	**Monthly Test**
8th	1st	Define modulus of a counter
	2nd	4-bit asynchronous counter and its timing diagram.
	3rd	Asynchronous decade counter.
	4th	4-bit synchronous counter.
	5th	Distinguish between synchronous and asynchronous counters.
9th	1st	State the need for a Register and list the four types of registers.
	2nd	Working of SISO, SIPO, Register with truth table using flip flop.
	3rd	PISO, PIPO Register with truth table using flip flop
	4th	**Review Class**
	5th	Introduction to microprocessor and microcomputer
10th	1st	Architecture of Intel 8085A Microprocessor and description of each block.
	2nd	Pin diagram and description.
	3rd	Stack, Stack pointer & stack top
	4th	Interrupts
	5th	**Monthly Test**
11th	1st	Opcode & Operand
	2nd	Differentiate between one byte, two byte & three byte instruction with example.
	3rd	Instruction set of 8085 example
	4th	Addressing mode
	5th	Fetch Cycle, Machine Cycle, Instruction Cycle, T-State
12th	1st	Timing Diagram for memory read, memory write, I/O read, I/O write
	2nd	Timing Diagram for 8085 instruction
	3rd	Counter and time delay.
	4th	Simple assembly language programming of 8085.
	5th	Cont. .....
13th	1st	**Review Class**
	2nd	Basics Interfacing Concepts.
	3rd	Memory mapping & I/O mapping
	4th	Functional block diagram of Intel 8255
	5th	Description of each block of Programmable peripheral interface Intel 8255
14th	1st	Cont.
	2nd	Application using 8255: Seven segment LED display,
	3rd	**Monthly Test**

	4th	Square wave generator
	5th	Traffic light Controller
15th	1st	**Review Class**
	2nd	Revision class
	3rd	Revision class
	4th	Revision class
	5th	Revision class

Rajesh kumar jena

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF WINTER -2023

Discipline: Elect. Engg.	**Semester:** Fifth (5th)	**Name of the Faculty:** JAYANTA KUMAR PANDA
Subject: Utilization of Electrical Energy & Traction(TH4)	**No. of days/week class allotted:** Five (5)	Semester From: 1st Aug 2023 to 30th Nov 2023 No. of Weeks: 17 weeks
WEEK	**CLASS DAY**	No. of Weeks: 19 weeks
1st	1st	Definition and Basic Principle of electro deposition, Important terms regarding electrolysis
	2nd	Laws of electrolysis
	3rd	Faradays Definition of Current efficiency, energy efficiency
	4th	principle of electro deposition
	5th	Factors affecting the amount of electro deposition
2nd	1st	Factors affecting the amount of electro deposition Factors governing the Better electro- deposition
	2nd	State simple Examples of extraction of metals
	3rd	State simple Examples of extraction of metals (Cont…)
	4th	Application of electrolysis
	5th	**Review Class**
3rd	1st	Advantage of electrical heating
	2nd	Explain Mode of heat transfer & stephens law
	3rd	Discuss principle of resistance heating(direct)
	4th	Discuss principle of resistance heating(indirect)
	5th	Explain working principle of direct arc furnace and indirect arc furnace
	1st	principle of induction heating

4th	2nd	Working principle of direct core type, vertical core type & indirect core type induction furnace
	3rd	principle of coreless induction furnace &skin effect
	4th	principle of dielectric heating & its application
	5th	**Monthly test**
5th	1st	principle of microwave heating & its application
	2nd	**Review Class**
	3rd	Explain Principle Of arc welding
	4th	Discuss DC arc phenomena
	5th	Discuss AC arc phenomena
6th	1st	DC arc welding plants of single and multi operation type
	2nd	AC arc welding plants of single and multi operation type
	3rd	Types of arc welding
	4th	Explain Principle of resistance welding
	5th	Descriptive Study of different resistance welding methods
7th	1st	**Review Class**
	2nd	Nature of radiation and its spectrum
	3rd	Terms used in illuminations. Luminous intensity, lumen and intensity of illumination
	4th	MHCP,MSCP,MHSCP
	5th	**Monthly test**
8th	1st	Brightness, solid angle and luminous efficiency
	2nd	Explain the inverse square law and the cosine law
	3rd	Explain polar curves
	4th	Describe Light distribution and control. Explain related definitions like maintenance factor and depreciation factor

	5th	Design Simple lighting schemes and depreciation factor

9th	1st	Constructional features and working of Filament lamps , effect of variation of voltage on working of filament lamps.
	2nd	Explain discharge lamps.
	3rd	State Basic idea about excitation in gas discharge lamps
	4th	State constructional features and operation of fluorescent lamp(PL and PLL lamps)
	5th	Sodium vapor lamps High pressure mercury vapor lamps
10th	1st	Neon sign Lamps
	2nd	High lumen output and low consumption F.L
	3rd	**Review Class**
	4th	**Monthly test**
	5th	State Group drive & individual drive
11th	1st	Method of Choice of electric drives
	2nd	Explain Starting & running characteristics of DC motor
	3rd	Starting & running characteristics of AC motor
	4th	State Application of DC motor
	5th	State Application of 3phase induction motor
12th	1st	Application of 3phase synchronous ,1phase induction motor, series motor, universal motor , repulsion motor.
	2nd	**Review Class**
	3rd	Explain System of traction
	4th	System of track electrification
	5th	Running characteristics of DC and AC traction motor

13th	1st	Explain controlof motorTapped field control
	2nd	Rheostat control
	3rd	Series parallel control
	4th	Multi-unit Control
	5th	Metadyne control
14th	1st	Explain Breaking of the following types Regenerative Breaking
	2nd	Breaking with 1-ph series motor
	3rd	Magnetic Breaking
	4th	**Review Class**
	5th	**Monthly test**
15th	1st	revision
	2nd	revision
	3rd	revision
	4th	revision
	5th	revision

Jayanta kumar panda

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF WINTER -2023

Discipline: Electrical	Semester: 5th	Name of the Teaching Faculty: RAJESH KUMAR JENA
Subject:PE &PLC(TH5)	No. of days/per week class allotted:4p/week	Semester From: 1st Aug 2023 to 30th Nov 2023 No. of weeks:17 weeks
Week	Class Day	Theory Topics
1st	1st	**1. 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(CONTD.)
	2nd	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET,GTO &IGBT
	3rd	1.2 Two transistor analogy of SCR.
	4th	1.3 Gate characteristics of SCR.
2nd	1st	1.4 Switching characteristic of SCR during turn on and turn off. (CONTD.)
	2nd	1.4 Switching characteristic of SCR during turn on and turn off.
	3rd	1.5 Turn on methods of SCR.
	4th	1.6 Turn off methods of SCR (Line commutation and Forced commutation) 1.6.1 Load Commutation
3rd	1st	1.6.2 Resonant pulse commutation
	2nd	1.7 Voltage and Current ratings of SCR.
	3rd	1.8 Protection of SCR 1.8.1 Over voltage protection
	4th	1.8.2 Over current protection 1.8.3 Gate protection
4th	1st	1.9 Firing Circuits 1.9.1 General layout diagram of firing circuit
	2nd	1.9.2 R firing circuits
	3rd	1.9.3 R-C firing circuit
	4th	1.9.4 UJT pulse trigger circuit
5th	1st	1.9.5 Synchronous triggering (Ramp Triggering)
	2nd	1.10 Design of Snubber Circuits
	3rd	**2. UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.** 2.1 Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter.(CONTD.)
	4th	2.1 Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter.
6th	1st	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
	2nd	2.3 Understand need of freewheeling diode.
	3rd	2.4 Working of single phase fully controlled converter with resistive and R- L loads.

	4th	2.5 Working of three-phase half wave controlled converter with Resistive load
7th	1st	2.6 Working of three phase fully controlled converter with resistive load.
	2nd	2.7 Working of single phase AC regulator.
	3rd	2.8 Working principle of step up & step down chopper. .
	4th	2.9 Control modes of chopper
8th	1st	2.10 Operation of chopper in all four quadrants(CONTD.)
	2nd	2.10 Operation of chopper in all four quadrants
	3rd	**3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS** 3.1 Classify inverters.
	4th	3.2 Explain the working of series inverter.
9th	1st	3.3 Explain the working of parallel inverter
	2nd	3.4 Explain the working of single-phase bridge inverter.
	3rd	3.5 Explain the basic principle of Cyclo-converter.
	4th	3.6 Explain the working of single-phase step up & step down Cyclo-converter.(CONTD.)
10th	1st	3.6 Explain the working of single-phase step up & step down Cyclo-converter.
	2nd	3.7 Applications of Cyclo-converter.
	3rd	**4. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS** 4.1 List applications of power electronic circuits.
	4th	4.2 List the factors affecting the speed of DC Motors.
11th	1st	4.3 Speed control for DC Shunt motor using converter.
	2nd	4.4 Speed control for DC Shunt motor using chopper.
	3rd	4.5 List the factors affecting speed of the AC Motors.
	4th	4.6 Speed control of Induction Motor by using AC voltage regulator.
12th	1st	4.7 Speed control of induction motor by using converters and inverters (V/F control).
	2nd	4.8 Working of UPS with block diagram.
	3rd	4.9 Battery charger circuit using SCR with the help of a diagram.
	4th	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
13th	1st	**5. PLC AND ITS APPLICATIONS** 5.1 Introduction of Programmable Logic Controller(PLC) 5.2 Advantages of PLC
	2nd	5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC. 5.4 Applications of PLC
	3rd	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
	4th	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.

14th	1st	5.8 Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
	2nd	5.9 Timers-i)T ON ii) T OFF and iii)Retentive timer
	3rd	5.10 Counters-CTU, CTD
	4th	5.11 Ladder diagrams using Timers and counters
15th	1st	5.12 PLC Instruction set
	2nd	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	3rd	5.14 Special control systems- Basics DCS & SCADA systems
	4th	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
16th	1st	Revision Class
	2nd	Revision Class
	3rd	Revision Class
	4th	Revision Class
17th	1st	Revision Class
	2nd	Revision Class
	3rd	Revision Class
	4th	Revision Class

Rajesh kumar jena

Signature of Teaching Faculty