COURSE COMPLETION UNIT PLAN/ SESSION:

DEPARTMENT: ELECTRICAL ENGINEERING
SEMESTER: 03RD
LECTURER NAME: MR. MONESH KUMAR GAJENDRA

SUBJECT : BASIC ELECTRONICS
SUBJECT CODE : 2025375(025) (THEORY)

S NO.	TOPIC TO TAUGHT	NO. OF LECTURE REQUIRED	DATE OF DELIVERY	ACTUAL DATE OF DELIVERY	TOPIC COVERED	REMARK
Chapter 01 : Semiconductor Diode						
I	PN - Junction diode: working, formation of depletion layer, construction, symbol and equivalent circuits of PN - Junction diode	02	02/9/2024 03/9/2024	02/9/2024 03/9/2024	PN-junction, concept of atomic structure, insulator conductor and semiconductor, depletion layer	
II	Barrier potential voltage, forward and reverse biasing, V-I characteristics of diode	02	04/9/2024 05/9/2024	04/9/2024 05/9/2024	diode symbol, equivelent circuit V-I characteristics	
III	Diode current equation, Static and Dynamic resistance, Diode capacitance	01	9/9/2024	9/9/2024	diode current eq. diode resistance & capacitance	
IV	Symbol, working and characteristic of other diodes like: LED, Photodiode, Varactor diode	03	10/9/24 11/9/24 12/9/24	10/9/2024 11/9/2024 12/9/2024	special purpose diode LED, photodiode, varactordiod	
Chapter 02 : Rectifiers and Filters						
I	Need for rectification, rectifier Parameters, PIV, Ripple factor, Efficiency, Peak Inverse Voltage (PIV), Transformer utilization factor (TUF) of rectifiers	02	18/9/2024 19/9/2024	18/9/2024 19/9/2024	Need of rectification. Block diagram of complete dc supply system.	
II	Types of rectifiers: Half Wave Rectifier, Full Wave rectifier, Center taped and Bridge type full wave rectifier	06	20/9/2024 21/9/2024 23/9/2024 25/9/2024 28-29/9/2024	20/9/2024 21/9/2024 23/9/2024 25/9/2024 28 3/10/24	Types of rectifier and rectifier parameter Ripple factor, η, TUF, PIV	
III	Filter Circuits: L – filter, C – filter, LC - filter, CLC - filter	02	03/10/2024 4/10/2024		Need of filter and types L, C, LC, CLC filter.	
Chapter 03 : Diode Circuits						
I	Zener diode: working, construction and equivalent circuits of Zener diode	01	5/10/24	5/10/24	Zener diode symbol working construction	
II	Zener and avalanche breakdown phenomenon, Zener diode as	01	16/10/24	16/10/24	V-I characteristics and eq. circuit. zener	

IV	Clamper: Function of clamper, types of clamper, positive and Negative clamper circuits	03	21,22,23/10/2024	21/10/2024 22/10/2024 23/10/2024	clamper, function of clamper ckt, +ve, -ve clamper	
Chapter 04 : Bipolar Junction Transistor (BJT) and Field effect transistor (FET)						
I	BJT: Working, types of BJT ; NPN and PNP, construction and operation of NPN and PNP transistor.	02	25/10/2024 26/10/2024	25/10/2024 25/10/2024	BJT working, type NPN, PNP construction and operation	
II	Modes of operation : active, saturation and Cut off, current amplification factor β and α	01	11/11/2024	11/11/2024	Mode of operation connection types α, β	
III	Transistor biasing: need for biasing, types of biasing, thermal runaway	03	12/11/2024 13/11/2024 14/11/2024	12/11/2024 13/11/2024 14/11/2024	Transistor biasing need of biasing & types	
IV	Transistor configurations: Common Emitter (CE), Common Base (CB) and Common collector configuration circuit, working and input and output characteristics.	03	16/11/2024 22/11/2024 25/11/2024	16/11/2024 22/11/2024 25/11/2024	Input and output characteristics of CE, CB and CC connection	
V	Field Effect Transistor (FET): Working, construction, input and output characteristics, drain current, pinch-off voltage	02	26/11/2024 27/11/2024	26/11/2024 27/11/2024	FET, Construction, working comparision FET, BJT I/p o/p characteristics	
Chapter 05 : Introduction to Operational Amplifier (OpAmp)						
I	Basics of differential amplifier, Working principle, input and output characteristics.	01	2/12/2024	2/12/2024	Introduction to op-amp differencial amplifier i/p o/p characteristics	
II	Basics of Op-Amp: OP-AMPIC-741, functional block diagram, virtual ground, configurations of working : inverting and non inverting, parameters : I/O resistance, gain, slew rate, bandwidth, power.	03	3/12/2024 4/12/2024 5/12/2024	3/12/2024 4/12/2024 5/12/2024	OP AMPIC-741 functional block diagram, Virtual ground, configaration of working inverting and non-inverting I/O resistance Slew rate bandwidth	
III	Applicaticns op-amp : Summing, multiplier, and divider amplifier, integrator and differentiator, Log and Anti-Log amplifier.	04	9/12/2024 10/12/2024 12/12/2024 13/12/2024	9/12/2024 10/12/2024 12/12/ 13/12/2024	Application summing multiplier, divider Integrator differentiator log & anti log amplifier	

S NO.	TITLE	
1.	Integrated Electronics	Millman Jacob; Halkias Christo; Parikh Chetan D / Mcgraw Hill Education, India
2.	Principles of Electronics	V.K Mehta, Rohit Mehta / S Chand

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COURSE COMPLETION UNIT PLAN, SESSION JANUARY JUNE 2025

DEPARTMENT: ELECTRICAL ENGINEERING **SUBJECT:** ELECTRICAL POWER GENERATION, TRANSMISSION AND DISTRIBUTION, 2024474 (024)

SEMESTER: 04[TH] (THEORY)

LECTURER NAME: MONESH KUMAR GAJENDRA

S NO.	TOPIC TO TAUGHT	NO. OF LECTURE REQUIRED	EXPECTED DATE OF DELIVERY	ACTUAL DATE OF DELIVERY	TOPIC COVERED	REMARK
Chapter 01 : Hydro - Electric Power Plant						
I	Various sources of Electrical Power Generation: Hydro, thermal, nuclear, solar, wind, bio-mass, geothermal, OTEC, etc.	02	27/02/2025 06/02/2025	27/02/25 6/2/25	Source of electrical power generation Hydro, thermal nuclear, solar, wind etc	
II	Hydroelectric power station (HPS): Energy conversion process, plant layout	01	13/2/25	13/2/25	Hydro electric power station energy conversion	
III	Hydrograph and simple calculation of electrical power generation, choice of site and constituents of hydroelectric power plant	03	15/2/25 17/2/25 18/2/25	15/2/25 17/2/25 18/2/25	Hydrograph and Simple calculation of electrical power generation, choice of site and constituents	
IV	Classification of HPS - based on; ➢ Head ➢ Storage and pondage ➢ Plant layout, types of hydro turbines ➢ Auxiliaries	03	19/2/25 20/2/25 21/2/25	19/2/25 20/2/25 21/2/25	classification of HPS- Head, storage and pondages, plant layout types of hydro turbine	
V	Synchronous Generators in HPS: Selection, number of poles, rotor speed and diameter.	01	24/2/25	24/2/25	Synchronous generation HPS, selection, number of poles, rotor speed	
Chapter 02 : Thermal and Nuclear Power Station						
I	Thermal power station: Energy conversion process, plant layout, site selection	02	25/2/25 27/2/25	25/2/25 27/2/25	Thermal power station energy conversion process plant layout	
II	Major equipment and auxiliaries of TPS : Boiler, steam turbine, Turbo	01	28/2/25	28/2/25	major equipment and auxiliaries of TPS	

	economizer and electrostatic precipitator etc)				heater, economizer and electrostatic.
III	NPS: Energy conversion process, Constituents of NPS and Layout, Selection of site	02	3/3/25 4/3/25	03/3/25 4/3/25	NPS energy conversion process, constituents of NPS
IV	Reactors: Main parts, Types and its Control	02	5/3/25 6/3/25	5/3/25 6/3/25	Reactors main parts, Types
V	Nuclear Fuels	01	7/3/25	7/3/25	Nuclear fuels
Chapter 03 : Variable Load on Generating Stations					
I	Structure of electrical power system.	01	10/3/25	10/3/25	Structure of electrical power system.
II	Connected load, Maximum demand, average demand, Demand factor, load factor, diversity factor, plant capacity factor and plant use factor and related numerical.	02	11/3/25 12/3/25	11/3/25 12/3/25	connected load, maximum demand, average demand factor load factor, Plant capacity factor
III	Load curve and Load duration curve	01	17/3/25	17/3/25	Load curve and load duration curve
IV	Base load and peak load on generating stations	01	18/3/25	18/3/25	Base load and peak load on generating.
V	Relationship between units generated per year, maximum demand and Load factor	01	19/3/25	19/3/25	Relationship B/w unit generated per year max^m demand load
VI	Cost of electrical energy and related numerical problems	01	21/3/25	21/3/25	Cost of electrical energy and Numerical
Chapter 04 : Transmission Line - Parameters and performance					
I	Transmission line parameters: Resistances, inductances and capacitances	01	25/03/25	25/03/25	Transmission line parameters resistance inductance & capacitance
II	Skin effect and effect of proximity	01	26/03/25	26/03/25	Skin effect and proximity
III	Stranding and transposition of conductors	01	27/03/25	27/03/25	Stranding and transposition
IV	Classification of transmission lines –Short, medium and long	01	01/04/25	01/04/25	classification of Transmission
V	Performance of transmission lines, voltage regulation and efficiency (Only lumped Short and Medium Transmission Line)	02	2/04/2025 3/04/2025	2/04/25 3/04/25	Performance of transmission line voltage regulation & efficiency.

VI	Equivalent circuits, T and π networks, ABCD constants, Ferranti effect, line losses				T & π N/w, ABCD const.
VII	Line insulators: requirements, types, Failure of insulators	01	4/04/2025	04/04/25	Line insulator, requirements types failure of insulators
VIII	String efficiency, methods of improving string efficiency (simple numerical)	02	7/04/2025 8/04/2025	7/4/25 0/04/25	String efficiency, method of improving string efficiency
Chapter 05 : Distribution System					
I	Feeders, distributors and service mains	01	9/04/2025	09/04/25	Feeders, distributors and service mains
II	Selection of conductor size based on current for distribution systems	02	14/04/25 15/04/25	14/04/25 15/04/25	Selection of conductor size based on current
III	Voltage drops in D.C. distributors	01	16/04/25	16/04/25	Voltage drop in DC distributors
IV	Voltages drop in A.C. distributors	01	22/04/25	22/04/25	Voltage drop in AC distributors
V	Types of underground power cables	01	23/04/25	23/04/25	Types of underground cable
VI	Construction of power cables	01	24/04/25	24/04/25	Construction of power cable
VII	Selection of power Cables for LT and HT connections	01	25/04/25	25/04/25	Selection of cables
VIII	Laying of underground power cables	01	28/04/25	28/04/25	underground power cable
IX	Faults in Power cables	01	29/04/25	29/04/25	fault in cables

REFERENCE BOOKS

S NO.	TITLE	AUTHOR / PUBLISHERS
1.	Principles of Power System	V.K. Mehta / S. Chand & Company
2.	A Course in Power Systems	J.B. Gupta / S. K. Kataria& Sons
3.	Power System Engineering	D.P. Kothari & I.J. Nagrath / Tata McGraw Hill Education

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DEPARTMENT: ELECTRICAL ENGINEERING
SEMESTER: 05TH
LECTURER NAME: MR. MONESH KUMAR GAJENDRA

SUBJECT : PSO&P
SUBJECT CODE : 2024572(024) (THEORY)

S NO.	TOPIC TO TAUGHT	NO. OF LECTURE REQUIRED	DATE OF DELIVERY	ACTUAL DATE OF DELIVERY	TOPIC COVERED	REMARK
Chapter 01 : Representation of Power System						
I	Single line representation of a simple power system with standard symbols.	02	22/8/2024	22/8/2024	Single line representation of simple power system.	
II	Single Phase representation of balanced three phase networks	01	24/8/2024	24/8/2024	1ϕ representation of balanced 3ϕ N/W	
III	Per unit (PU system): Introduction, representation, change of base and simple numerical.	01	27/8/2024	27/8/2024	Per unit - introduction representation, change of base.	
IV	Complex power flow, Concept of torque or Load angle (δ) and Power factor angle (θ)	01	28/08/2024	28/8/2024	Numericals, complex power flow, concept of torque or load angle	
V	Simplified representation of Synchronous Machines	01	29/8/2024	29/8/2024	Synchronous machine	
VI	Power angle curve of a synchronous generator	01	30/8/2024	30/8/2024	Power angle curve of synchronous generator.	
Chapter 02 : Power System faults and Stability						
I	Symmetrical Faults: Definition of in a transmission lines, Sub transient, transient and steady state period; reactance offered, LLL and LLLG faults	01	1/9/2024	1/9/2024	Symmetrical fault definition of transmission line, Sub transient and steady state period. LLL & LLLG fault.	
II	Definition: Short Circuit Capacity (SCC) of a bus, Simple Numerical	01	3/9/2024	3/9/2024	Short circuit capacity of BUS Numerical	
III	Unsymmetrical faults : LG, LL, LLG faults and their effects	01	4/9/2024	4/9/2024	Unsymmetrical faults LG, LL, LLG fault.	
IV	Stability: Introduction, Steady state and transients' stability, Stability limit	01	5/9/2024	5/9/2024	Stability introduction Steady state and transient	
V	Steady State stability: static and dynamic stability	01	14/9/2024	14/9/2024	Steady state stability static & dynamic stability	
VI	Transient stability : swing curve, Introduction to equal area criteria of stability and its applications	01	16/9/2024	16/9/2024	Transient stability swing curve introduction and application	

Chapter 03 : Active and Reactive Power Control					
I	Introduction to active and reactive power in power system and their sources. Requirement of reactive power in power system.	01	18/9/2024	18/9/2024	Introduction to active and reactive power in power system. requirment power system.
II	Effect of DC excitation on lagging and leading operation of a synchronous machine, V curve of a synchronous machine.	02	19/9/2024 20/9/2024	19/9/2024 21/9/2024	effect of DC excitation on lagging and leading operation V curve of synchronous m/c
III	Voltage control in power system: shunt reactor, synchronous phase modifier, shunt capacitors, series capacitors, static VAR system and related circuit diagram.	02	23/9/2024 24/9/2024	22/9/2024 23/9/2024	Voltage control in power system, shunt reactor, synchronous phase modifier static VAR system and related ckt diagram.
Chapter 04 : Elements of Protection and Circuit Interrupting Devices					
I	Basic elements of a protective system.	01	23/10/2024	25/10/2024	Basic element of protective system
II	Types, causes and effects of various Faults.	01	23/10/2024	23/10/2024	Types, causes and effect of various fault
III	Protection zones : Backup protection zones	01	23/10/2024	23/10/2024	Protection zone Bakup zone
IV	CT and PT: Specifications and Connection diagram (1 phase and 3 phase)	01	24/10/2024	24/10/2024	CT & PT specification connection diagram
V	Current limiting reactors.	01	24/10/2024	24/10/2024	current limiting reactors.
VI	Neutral Earthing	01	24/10/2024	24/10/2024	Neutral earthing
VII	Interrupting devices: Sequence of operation and interlocking	01	25/10/2024	25/10/2024	Interrupting devia-sequence operation.
VIII	Isolators and Fuses: types, features, testing and applications	01	25/10/2024	25/10/2024	Isolator and fuse types features testing applicat
IX	Construction, working and testing of circuit breakers: Air break, Air Blast, Sulphur Hexa - Fluoride (SF6), vacuum and oil circuit breakers	01	25/10/2024	25/10/2024	construction working and testing of circuit, Air break. Air blast. Sulphur Hexa - fluoride
X	Auto-reclosure, Arc phenomena and extinction	01	11/11/2024	11/11/2024	SF6 vaccume and oil ckt breaker auto-reclosure arc phenomena
XI	Resistance switching	01	11/11/2024	11/11/2024	Resistance Switching
XII	Working principle of	01	11/11/2024	11/11/2024	working principle of

Chapter 05 : Protective Relays and Circuit Breaker

I	Protective relay: Principle of working, construction and operation of electromagnetic induction (shaded pole, watt-hour meter and induction cup), Settings	01	16/11/2024	16/11/2024	Protective relay principle of working, construction and operation of electro magnetic induction
II	Relay Types: Thermal relay, Directional relay, Distance relay (Impedance, reactance and mho), Negative phase sequence relay, Static relay, Microprocessor based relay: Principle and working	03	17/11/2024 18/11/2024 19/11/2024	17/11/2024 18/11/2024 19/11/2024	Relay type - Thermal relay, direction relay distance relay, negative phase sequence relay, static relay
III	Maintenance and testing of relays	03	22/11/2024 23/11/2024 24/11/2024	22/11/2024 23/11/2024 24/11/2024	Maintance and testing of relay.
IV	Various faults and abnormal operating conditions in Alternator and its protection schemes	02	28/11/2024 29/11/2024	28/11/2024 29/11/2024	Various faults and abnormal operating conds in alternator
V	Various faults and abnormal occurring in the Motor and its protection schemes	02	30/11/2024 11/12/2024	30/11/2024 11/12/2024	Faults in motor and its protection schemes
VI	Differential Protection of Bus bars	02	12/12/2024 12/12/2024	12/12/2024 12/12/2024	Bus Bars Protection
VII	Over current, Percentage differential and restricted earth fault protection of Transformers	02	13/12/2024 14/12/2024	13/12/2024 14/12/2024	Over current protection of X-mer
VIII	Inrush phenomenon and over fluxing phenomenon in Transformer.	02	21/12/2024 22/12/2024	21/12/2024 22/12/2024	Inrush phenomenon and over fluxing in X-mer
IX	Buchholz Relay, analysis of trapped Gases.	01	25/12/2024	25/12/2024	Buchholz relay
X	Transmission line protection scheme	01	26/12/2024	26/12/2024	Transmission line protection scheme
XI	Protection scheme -Overload protection, Overcurrent and earth fault protection, Time graded and current graded protection, Current balance differential protection.	02	2/12/2024 3/12/2024 4	2/12/2024 3/12/2024	Protection scheme Over load, Overcurrent Time graded, current graded protection
XII	Carrier aided protection, Carrier inter-tripping, acceleration and blocking scheme	01	4/12/2024	4/12/2024	carrier aided protection

XIV	Protection of parallel feeders and Ring Mains	01	5/12/2024	5/12/2024	Working of [illegible] using mains	

REFERENCE BOOKS

S NO.	TITLE	AUTHOR
1.	PRINCIPLE OF POWER SYSTEM	V.K. MEHTA / S. CHAND PUBLICATIONS
2.	POWER SYSTEM ANALYSIS	NAGRATH & KOTHARI / TMH
3.	POWER SYSTEM ANALYSIS	ASHFAQ HUSSAIN / DANPAT RAI PUBLICATION

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COURSE COMPLETION UNIT PLAN, SESSION JANUARY JUNE 2025

DEPARTMENT: ELECTRICAL ENGINEERING

SEMESTER: 06TH

SUBJECT: UTILIZATION OF ELECTRICAL ENERGY & TRACTION 2024671 (024)

LECTURER NAME: MONESH KUMAR GAJENDRA

S NO.	TOPIC TO TAUGHT	NO. OF LECTURE REQUIRED	EXPECTED DATE OF DELIVERY		ACTUAL DATE OF DELIVERY	TOPIC COVERED	REMARKS
Chapter 01 : Electrical Drives							
I	Types of electrical drives					Types of electrical drive	
II	Motors used for electrical drives; DC series, shunt and separately excited motors, Induction Motor	02	22/01/25		22/01/25	Types of motor series, sheunt and induction motor	
III	Selection of Electrical motors.					separately excited	
IV	Torque / speed and torque / current characteristics of DC series, shunt and separately excited motors, characteristics of three phase induction motors.	03	30/01/25		30/01/25	motor, selection of electrical motor. Torque/speed characteristics	
V	Heating and Cooling of electrical motors – Heating and cooling curves, insulating materials.	02	11/2/25		11/2/25	characteristics of threephase induction motors. Heating and	
VI	Size and rating of motors standard ratings of motors, classes of duty, ambient temperature and ratings, ambient temperature and ratings, motors used for different types of applications, temperature rise with short time ratings.	03	17/2/25		17/2/25	cooling of electrical motor. curve. insulating material Size and rating of motors. motor applicatio	
VII	Types of load : Classification of loads with respect to time, classification of loads with respect to duty cycles. Enclosures for rotating electrical machines.	02	28/02/25		28/2/25	ambient temperature and rating. classification of load with respect to duty cycle	
			01/03/25		1/3/25		

Chapter 02 : Electric Heating And Welding						
I	Advantages of Electrical heating.	01	11/3/25		11/3/25	Advantage of Heating
II	Essential Requirements of a good heating element, materials of heating element, causes of failure of heating element	02	12/3/25 18/3/25		12/3/25 18/3/25	Requirement of Heating element matrial, failure
III	Methods of electric heating – resistance heating, arc heating, high frequency heating, induction heating, dielectric heating.	02	19/3/25		19/3/25	Different method of electrical Heating
IV	Types of resistance welding, choice of welding time, electric arc welding, Types of welding electrodes,	02	20/3/25 21/3/25		20/3/25 21/3/25	Types of resistance welding. Types of welding electrods.
V	Welding transformers and rectifiers.	01	22/3/25		22/3/25	Transformer & rectifier welding
Chapter 03 : Illumination						
I	Introduction: Terms used in illumination, laws of illumination.	01	24/3/25		24/3/25	Terms used in illumination
II	Types of sources of illumination – Electric arc, incandescent, gaseous discharge, fluorescent.	02	27/3/25		27/3/25	Types and source of illumination
III	Arc lamps, incandescent lamps, laser, LED, neon, Tungsten - Halogen and Sodium Vapour lamps, Fluorescent lamps.	02	28/3/25 29/3/25		28/3/25 29/3/25	arc lamps, incandescent lamp, lasar LED sodium vapour lamps
IV	Types of lighting schemes: direct, semi direct, Semi-indirect, Indirect lighting and general lighting schemes.	03	01/3/25		01/04/25	Types of lighting schemes. direct-semi direct
VI	General ideas about street lighting, factory lighting and flood lighting	02	2/4/25		2/4/25	General idea about Street and flood light
Chapter 04 : Electric Traction Drives						
I	Requirements of ideal traction system, advantages and	01	3/4/25			Requirement of ideal traction system

II	System of track electrification – DC system, single phase AC system, three phase AC system, Composite system	02	9/4/25		9/4/25	electrical traction. Track electrification - dc system 1φ & 3φ system
III	Special mechanical and electrical features of traction motors, current collectors	03	14/4/25		14/4/25	features of traction motors
IV	Traction motors: DC series, Three phase induction motors	01	15/4/25		15/4/25	Traction motor DC series shunt & induction
V	Types of electric braking: Plugging, Rheostat or Dynamic braking, Regenerative braking.	02	17/4/25		17/4/25	Types of electrical braking, plugging
Chapter 05 : Other Aspects of Electric Traction						
I	Types of service- Main line services, Urban services, suburban services.	01	22/4/25		22/4/25	Types of service
II	Speed-time and speed distance curves for main line service, suburban service and urban and city service.	02	23/4/25		23/4/25	Speed-time curve for different service line
III	Basic definitions: Crest speed, average speed, schedule speed, schedule time, Factors affecting the schedule speed of a train.	03	24/4/25		24/4/25	defination crest speed, avg speed schedule speed, time factors.
IV	Factors affecting the schedule speed of a train, Simplified trapezoidal and quadrilateral speed time curves, Tractive effort.	03	25/4/25		25/4/25	factor affecting schedule speed of train simplified curve
V	Specific energy consumption, dead weight, accelerating Weight, adhesive weight, coefficient of adhesion, advantages and disadvantages of regenerative braking.	03	26/4/25 1/5/25 2/5/25		26/4/25 1/5/25 2/5/25	Tractive effort specific energy consumption dead weight advantage disadvantage of regenerative braking

REFERENCE BOOKS

S NO.	TITLE	AUTHOR
1.	UTILIZATION OF ELECTRICAL ENERGY & ELECTRIC TRACTION	J.B. GUPTA
2.	PRINCIPLES OF POWER SYSTEM	V.K. MEHTA & ROHIT MEHTA
3.	UTILIZATION OF ELECTRICAL POWER	Er. R.K. RAJPUT
4.	GENERATION AND UTILIZATION OF ELECTRICAL ENERGY	S. SIVANAGARAJU

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