Discipline :- ELECTRICAL	Semester:- 5th	Name of the Teaching Faculty:-BISWANATH PRATAP SINGH
ENTREPRENEURSHIPand MANAGEMENT & SMART TECHNOLOGY	No of Days/per Week Class Allotted :-04	Semester From:-14.07.2025 To:- 15.11.2025 No of Weeks:- 18
Week	**Class Day**	**Theory**
1st	1st	1. **Entrepreneurship** Concept / Meaning of Entrepreneurship ,
	2nd	Need of Entrepreneurship , Characteristics
	3rd	Quality and Types of Entrepreneur,Functions,
	4th	Barriers of entrepreneurship
2nd	1st	Entrepreneur Vs Manager
	2nd	Forms of Business Ownership ; Sole proprietorship, partnership forms and others
	3rd	Types of industries, Concept of start-ups
	4th	Entrepreneurial support agencies at National , State , District Level (sources): DIC , NSIC, OSIC, SIDBI, NABARD , Commerecial Banks , KVIC etc
3rd	1st	Technology business incubators (TBI) and Science and Technology Entrepreneur Parks
	2nd	**2.Market Survey and Opportunity Identification (Business Planning)** Business planning
	3rd	SSI, Ancillary Units , Tiny Units , Service sector Units
	4th	Time schedule plan , Agencies to be contacted for project Implementation
4th	1st	Assessment of Demand and Supply
	2nd	Potential areas of Growth
	3rd	Identifying Business Oppertunity
	4th	Final product selection
5th	1st	**3.Project report Preparation** Preliminary project report
	2nd	Detailed project report
	3rd	Techno economic feasibility
	4th	Project viability
6th	1st	**4.Management Principles** Definations of management
	2nd	Principles of management
	3rd	Functions of management (planning, organizing staffing, directing and controlling etc.)
	4th	Level of Management in an Organisation
7th	1st	**5.Functional Areas of management** a)Production management->Functions , activities , Productivity
	2nd	Quality control , Production planning and control
	3rd	b)Inventory Management

		Need for Inventory management
	4th	Model/ Techniques of inventory management
8th	1st	c)Financial management Functions of financial management , management of working capital, Costing (only concept) ,Break even analysis
	2nd	Brief idea about accounting Terminologies: Book Keeping , Jourrnal entry ,Petty Cash book , P & L Accounts, Balance Sheets (only concepts)
	3rd	d)Marketing Management Concept of Marketing and Marketing Management Marketing Techniques (only concept)
	4th	Concept of 4P s (price ,place ,product ,promotion)
9th	1st	e)Human Resource Management Function of Personnel Management, Man power planning ,
	2nd	Recruitment ,Sources of manpower ,Selection of manpower , Selection process , Method of Testing ,
	3rd	Methods of Training & Development , Payment of Wages
	4th	**6.Leadership and Motivation** a)Leadership Defination and Need/ Importance
10th	1st	Qualities and Functions of a leader
	2nd	Manager Vs Leader
	3rd	Style of leadership (Autocratic , Democratic , Participative)
	4th	b)Motivation Defination and Characteristics, Importance of motivation
11th	1st	Factors affecting motivation
	2nd	Theories of motivation (Maslaw)
	3rd	Methods of improving Motivation
	4th	Importance of Communication in Business
12th	1st	**7.Work Culture , TQM & Safety** Types and Barriers of Communication
	2nd	Human relationship and Performance in Organization
	3rd	Relation with Peers , Superiors and Subordinates
	4th	TQM concepts: Quality policy , Quality Management , Quality system
13th	1st	Accidents and safety , causes and preventive measures
	2nd	General safety Rules, Personal Protection Equipment (PPE)
	3rd	**8.Legislation** Intellectual Property Rights (IPR)
	4th	Patents, Trademarks, Copyrights
14th	1st	Features of factories Act 1948with amendment(only salient point)
	2nd	Features of Payment of Wages Act 1936(only salient point)
	3rd	**9.Smart Technology**

		Concept of IOT ,How IOT works
	4th	Components of IOT
15th	1st	Characteristics of IOT ,Categories of IOT
	2nd	Application of IOT – Smart cities ,Smart transportion
	3rd	Smart Home , Smart Healthcare Smart industry
	4th	Smart Agriculture, Smart Energy Manaagementetc
16th	1st	EXTRA CLASSES
	2nd	EXTRA CLASSES
	3rd	EXTRA CLASSES
	4th	EXTRA CLASSES
17th	1st	EXTRA CLASSES
	2nd	EXTRA CLASSES
	3rd	DOUBT CLEARING CLASSES
	4th	DOUBT CLEARING CLASSES
18th	1st	DOUBT CLEARING CLASSES
	2nd	DOUBT CLEARING CLASSES
	3rd	DOUBT CLEARING CLASSES
	4th	DOUBT CLEARING CLASSES

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Teaching Faculty

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Discipline:- Electrical Engineering	Semester:- 5th	Name of the teaching faculty:-PRABHAT RASHMI MALLIK
Subject:- Energy conversion -II	No. of days/ per week class allotted:-4	Semester from:- 14.07.2025 To:- 15.11.2025 No. of weeks:18
Week	Class day	Theory
1st	1st	**1. ALTERNATOR:** 1.1. Types of alternator and their constructional features
	2nd	1.2. Basic working principle of alternator and the relation between speed and frequency
	3rd	1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	4th	1.4. Explain harmonics, its causes and impact on winding factor.
2nd	1st	1.5. E.M.F equation of alternator. (Solve numerical problems).
	2nd	1.6. Explain Armature reaction and its effect on emf at different power factor of load.
	3rd	1.6. Explain Armature reaction and its effect on emf at different power factor of load.
	4th	1.7. The vector diagram of loaded alternator. (Solve numerical problems
3rd	1st	1.7. The vector diagram of loaded alternator. (Solve numerical problems
	2nd	1.8. Testing of alternator (Solve numerical problems) 1.8.1. Open circuit test.
	3rd	1.8.2. Short circuit test
	4th	1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
4th	1st	1.10. Parallel operation of alternator using synchro-scope and dark & bright lamp method
	2nd	1.11. Explain distribution of load by parallel connected alternators.
	3rd	**2. SYNCHRONOUS MOTOR:** 2.1. Constructional feature of Synchronous Motor.
	4th	2.2. Principles of operation, concept of load angle
5th	1st	2.3. Derive torque, power developed.
	2nd	2.4. Effect of varying load with constant excitation
	3rd	2.5. Effect of varying excitation with constant load. 2.6. Power angle characteristics of cylindrical rotor motor
	4th	2.7. Explain effect of excitation on Armature current and power factor. 2.8. Hunting in Synchronous Motor
6th	1st	2.9. Function of Damper Bars in synchronous motor and generator. 2.10. Describe method of starting of Synchronous motor.
	2nd	2.10. Describe method of starting of Synchronous motor 2.11. State application of synchronous moto

	3rd	**3. THREE PHASE INDUCTION MOTOR:** 3.1. Production of rotating magnetic field.
	4th	3.2. Constructional feature of Squirrel cage and Slip ring induction motors.
7th	1st	3.3. Working principles of operation of 3-phase Induction motor..
	2nd	3.4. Define slip speed, slip and establish the relation of slip with rotor quantities
	3rd	3.5. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
	4th	3.5. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
8th	1st	3.6. Torque-slip characteristics
	2nd	. 3.7. Derive relation between full load torque and starting torque etc. (solve numerical problems)
	3rd	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)
	4th	3.9. Methods of starting and different types of starters used for three phase Induction motor.
9th	1st	3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods
	2nd	3.11. Plugging as applicable to three phase induction motor
	3rd	3.12. Describe different types of motor enclosures.
	4th	3.13. Explain principle of Induction Generator and state its applications
10th	1st	**4. SINGLE PHASE INDUCTION MOTOR:** 4.1. Explain Ferrari's principle.
	2nd	4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor.
	3rd	4.3. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors 4.3.1. Split phase motor.
	4th	4.3.2. Capacitor Start motor.
11th	1st	4.3.3. Capacitor start, capacitor run motor

	2nd	4.3.4. Permanent capacitor type motor.
	3rd	4.3.5. Shaded pole motor
	4th	4.4. Explain the method to change the direction of rotation of above motors.
12th	1st	**5. COMMUTATOR MOTORS:** 5.1. Construction, working principle of single phase series motor
	2nd	5.1. Running characteristic and application of single phase series motor
	3rd	5.2. Construction of Universal motors
	4th	5.2. working principle and application of Universal motors
13th	1st	5.3. Working principle of Repulsion start Motor
	2nd	5.3. Working principle of Repulsion start Induction run motor,Repulsion Induction motor.
	3rd	**6. SPECIAL ELECTRICAL MACHINE:** 6.1. Principle of Stepper motor.
	4th	6.2. Classification of Stepper motor.
14th	1st	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 6.6. Applications of Stepper motor.
	4th	**7. THREE PHASE TRANSFORMERS:** 7.1. Explain Grouping of winding, Advantages.
15th	1st	7.2. Explain parallel operation of the three phase transformers.
	2nd	7.3. Explain tap changer (On load tap changing.
	3rd	7.4 Expiain Off load tap changing
	4th	7.4. Maintenance Schedule of Power Transformers.
16th	1st	DOUBT CLEARING CLASSES
	2nd	DOUBT CLEARING CLASSES
	3rd	DOUBT CLEARING CLASSES
	4th	DOUBT CLEARING CLASSES
17th	1st	Problem Solving Classes
	2nd	DOUBT CLEARING CLASSES
	3rd	Problem Solving Classes
	4th	EXTRA CLASSES
18th	1st	EXTRA CLASSES
	2nd	EXTRA CLASSES

	3rd	EXTRA CLASSES
	4th	EXTRA CLASSES

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Teaching Faculty

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Discipline: **ELECTRICAL ENGINEERING**	Semester :**5th**	Name of the Teaching Faculty: SOMA DAS
Subject: DE&MP	No. of days/per week class allotted:**05**	Semester From date : 08.08.2025 To:- 15.11.2025
Week	**Class Day**	**Theory Topics**
1ST	1ST	Binary, Octal, Hexadecimal number systems and compare with Decimal system.
	2ND	Binary addition, subtraction, Multiplication and Division.
	3RD	1's complement and 2's complement numbers for a binary number
	4th	Subtraction of binary numbers in 2's complement method.
	5th	Use of weighted and Un-weighted codes & write Binary equivalent number for a number in 8421,Excess-3 and Gray Code and vice-versa
2ND	1ST	Importance of parity Bit.
	2ND	Logic Gates: AND, OR, NOT, NAND, NOR and EX-OR gates with truth table. 1.8 Realize
	3RD	Realize AND, OR, NOT operations using NAND, NOR gates
	4th	Different postulates and De-Morgan's theorems in Boolean algebra
	5th	Use Of Boolean Algebra For Simplification Of Logic Expression
3RD	1ST	Karnaugh Map For 2,3,4 Variable, Simplification Of SOP And POS Logic Expression Using K-Map.
	2ND	Give the concept of combinational logic circuits
	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	Full adder circuit and explain its operation with truth table
4TH	1ST	Realize full-adder using two Half-adders and an OR – gate and write truth table
	2ND	Full subtractor circuit and explain its operation with truth table.
	3RD	Operation of 4 X 1 Multiplexers and 1 X 4 demultiplexer
	4th	Working of Binary-Decimal Encoder & 3 X 8 Decoder
	5th	Working of Two bit magnitude comparator
5TH	1ST	Give the idea of Sequential logic circuits
	2ND	State the necessity of clock and give the concept of level clocking and edge triggering
	3RD	Clocked SR flip flop with preset and clear inputs.
	4th	Construct level clocked JK flip flop using S-R flip-flop and explain with truth table

	5th	Concept of race around condition and study of master slave JK flip flop.
6TH	1ST	Give the truth tables of edge triggered D and T flip flops and draw their symbols.
	2ND	Applications of flip flops.
	3RD	Define modulus of a counter 4-bit asynchronous counter
	4th	4-bit asynchronous counter's timing diagram
	5th	Asynchronous decade counter
7TH	1ST	4-bit synchronous counter.
	2ND	Distinguish between synchronous and asynchronous counters
	4th	State the need for a Register and list the four types of registers.
	5th	WORKING OF PISO, PIPO Register with truth table using flip flop
8TH	1ST	Introduction to Microprocessors
	2ND	Evolution of digital computer, Microprocessors
	3RD	Basics of CPU and its block diagram
	4th	Basics of Memory, different types of Memory
	5th	Buses- Data, Address and Control Bus
9TH	1ST	Architecture of Intel 8085A Microprocessor
	2ND	Description of each block in Architecture
	3RD	Status Flag concept
	4th	Status flag with examples
	5th	Stack, Stack pointer & stack top
10TH	1ST	Pin diagram
	2ND	Grouping of pins
	3RD	Description of each groups briefly
	4th	Relation between IO/Memory and read-write operation
	5th	Reset instruction
11TH	1ST	Address and Address-Data instruction
	2ND	Interrupts
	3RD	Opcode & Operand
	4th	one byte, two byte & three byte instruction
	5th	Differentiate between one byte, two byte & three byte instruction with example.
12TH	1ST	Instruction set of 8085
	2ND	Instruction set of 8085 example
	3RD	Addressing mode
	4th	Fetch Cycle, Machine Cycle, Instruction Cycle, T-State
	5th	Using of Fetch Cycle, Machine Cycle, Instruction Cycle, T-State in Timing Diagram

13RD	1ST	Timing Diagram for memory read, memory write
	2ND	Timing Diagram for I/O read, I/O write
	3RD	Timing Diagram for 8085 instruction
	4th	Timing Diagram for 8085 instruction with examples
	5th	Counter and time delay
14TH	1ST	Simple assembly language programming of 8085
	2ND	Simple assembly language programming of 8085
	3RD	Introduction to interfacing and support chips
	4th	Basic Interfacing Concepts
	5th	Memory mapping & I/O mapping
15TH	1ST	Functional block diagram and description of each block of Programmable peripheral interface Intel 8255
	2ND	Description of each block of Programmable peripheral interface Intel 8255
	3RD	Application using 8255: Seven segment LED display
	4th	Application using 8255: Square wave generator
	5th	Application using 8255: Traffic light Controller

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Teaching Faculty

08/08/25
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Discipline:- Electrical Engineering	Semester:- 5th	Name of the teaching faculty:-PRABHAT RASHMI MALLIK
Subject:- Utilization Of Electrical Energy And Traction	No. of days/ per week class allotted:-4	Semester from:- 14.07.2025 To:- 15.11.2025 No. of weeks:18
Week	Class day	Theory
1st	1st	**1. ELECTROLYTIC PROCESS** 1.1 Definition and Basic principle of Electro Deposition.
	2nd	1.2 Important terms regarding electrolysis
	3rd	1.3 Faradays Laws of Electrolysis. 1.4 Definitions of current efficiency, Energy efficiency
	4th	1.5 Principle of Electro Deposition.
2nd	1st	1.6 Factors affecting the amount of Electro Deposition
	2nd	1.7 Factors governing the electro deposition.
	3rd	1.8 State simple example of extraction of metals.
	4th	1.9 Application of Electrolysis.
3rd	1st	**ELECTRICAL HEATING** 2.1. Advantages of electrical heating. 2.2. Explain mode of heat transfer and Stephen's Law.
	2nd	2.3. Discuss principle of Resistance heating. Direct Resistance heating. Indirect Resistance heating
	3rd	2.4. Explain working principle of direct arc furnace and indirect arc furnace.
	4th	2.5. Principle of Induction heating
4th	1st	2.5.1 Working principle of direct core type, vertical core type and indirect core type Induction furnace.
	2nd	2.5.2. Principle of coreless induction furnace and skin effect.
	3rd	2.6. Principle of dielectric heating and its application
	4th	2.7. Principle of Microwave heating and its application.
5th	1st	**PRINCIPLES OF ARC WELDING** 3.1 Explain principle of arc welding.
	2nd	3.2 Discuss D. C. & A. C. arc phenomena
	3rd	3.3 D.C. & A. C. arc welding plants of single and multi-operation type.
		3.3 D.C. & A. C. arc welding plants of single and multi-operation type.
6th	1st	3.4 Types of arc welding
	2nd	3.5 Explain principles of resistance welding.
	3rd	3.6 Descriptive study of different resistance welding methods.
	4th	3.6 Descriptive study of different resistance welding methods.
7th	1st	**4. ILLUMINATION**

		4 . 1 Nature of Radiation and its spectrum.
	2nd	4 . 2 Terms used in Illuminations. i. Luminous intensity ii. Lumen iii. Intensity of illumination iv. MHCP v. MSCP vi. MHSCP vii. Brightness viii. Solid angle ix. Luminous efficiency
	3rd	4 . 3 Explain the inverse square law and the cosine law
	4th	4 . 4 Explain polar curves.
8th	1st	4 . 5 Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.
	2nd	4 . 6 Design simple lighting schemes and depreciation factor.
	3rd	4. 7 Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.
	4th	4 . 8 Explain Discharge lamps.
9th	1st	4 . 9 State Basic idea about excitation in gas discharge lamps. 4 . 10 State constructional factures and operation of: - Fluorescent lamp. (PL and PLL Lamps)
	2nd	4.11 Sodium Vapor lamp
	3rd	4.12 High Pressure Mercury vapor lamp
	4th	4.13 Neon sign lamp 4.14 High Lumen output & low consumption fluorescent lamp
10th	1st	**INDUSTRIAL DRIVES** 5 . 1 State group and individual drive.
	2nd	5 . 2 Method of choice of electric drives.
	3rd	5 . 3 Explain starting and running characteristics of DC and AC motor.
	4th	5 . 3 Explain starting and running characteristics of DC and AC motor.
11th	1st	5 . 3 Explain starting and running characteristics of DC and AC motor.
	2nd	5 . 3 Explain starting and running characteristics of DC and AC motor.
	3rd	5 . 4 State Application of : 5.4.1 DC motor
	4th	5.4.2 3-phase induction motor

12th	1st	5.4.3 3-phase synchronous motors
	2nd	5.4.4 Single phase induction ,series motor, universal motor &repulsion motor
	3rd	**ELECTRIC TRACTION** 6. 1. Explain system of traction
	4th	6. 1. Explain system of traction
13th	1st	6. 2. System of Track electrification
	2nd	6. 2. System of Track electrification
	3rd	6. 3. Running Characteristics of DC and AC traction motor
	4th	6. 3. Running Characteristics of DC and AC traction motor
14th	1st	6. 4. Explain control of motor 6.4.1 Tapped field control
	2nd	6. 4. 2 Rheostatic control
	3rd	. 6.4.3 Series parallel control
	4th	6. 4.4 Multi-unit control
15th	1st	6.4.5 Explain control of Metadyne control
	2nd	6. 5. Explain Braking of the following types. 6.5.1 Regenerative Braking
	3rd	6.5.2 Braking with 1-phase series motor
	4th	6.5.3 Magnetic Braking
16th	1st	DOUBT CLEARING CLASSES
	2nd	DOUBT CLEARING CLASSES
	3rd	DOUBT CLEARING CLASSES
	4th	DOUBT CLEARING CLASSES
17th	1st	DOUBT CLEARING CLASSES
	2nd	DOUBT CLEARING CLASSES
	3rd	DOUBT CLEARING CLASSES
	4th	EXTRA CLASSES
18th	1st	EXTRA CLASSES
	2nd	EXTRA CLASSES
	3rd	EXTRA CLASSES
	4th	EXTRA CLASSES

11/07/2025
Teaching Faculty

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Academic Coordinator

Discipline:ELECTRICAL ENGINEERING	Semester :5th	Name of the Teaching Faculty: PRATIK DAS & PREETINANDA MISRA
Subject: PE&PLC	No. of days/per week class allotted:04	Semester From date : 09.09.2025 To:- 15.11.2025
Week	**Class Day**	**Theory Topics**
1ST	1ST	Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET,GTO &IGBT
	2ND	Two transistor analogy of SCR. Gate characteristics of SCR.
	3RD	Switching characteristic of SCR during turn on and turn off.
	4th	Turn on methods of SCR.
2ND	1ST	Turn off methods of SCR (Line commutation and Forced commutation) - Load Commutation ,Resonant pulse commutation
	2ND	Voltage and Current ratings of SCR.
	3RD	Protection of SCR - Over voltage protection, Over current protection ,Gate protection
	4th	Firing Circuits- General layout diagram of firing circuit , R firing circuits, R-C firing circuit , UJT pulse trigger circuit
3RD	1ST	Synchronous triggering (Ramp Triggering) Design of Snubber Circuits
	2ND	Controlled rectifiers Techniques(Phase Angle, Extinction Angle control) Single quadrant semi converter
	3RD	Two quadrant full converter and dual Converter Working of single-phase half wave controlled converter with Resistive and R-L loads.
	4th	Understand need of freewheeling diode. Working of single phase fully controlled converter with resistive and R- L loads
4TH	1ST	Working of three-phase half wave controlled converter with Resistive *load*
	2ND	Working of three phase fully controlled converter with resistive load.
	3RD	Working of single phase AC regulator Working principle of step up & step down chopper.
	4th	Control modes of chopper Operation of chopper in all four quadrants.
5TH	1ST	Classify inverters. Explain the working of series inverter.
	2ND	Explain the working of parallel inverter Explain the working of single-phase bridge inverter.
	3RD	Explain the basic principle of Cyclo-converter.

	4th	Explain the working of single-phase step up & step down Cyclo-converter. Applications of Cyclo-converter.
6TH	1ST	List applications of power electronic circuits. List the factors affecting the speed of DC Motors.
	2ND	Speed control for DC Shunt motor using converter.
	3RD	Speed control for DC Shunt motor using chopper. List the factors affecting speed of the AC Motors.
	4th	Speed control of Induction Motor by using AC voltage regulator.
7TH	1ST	Speed control of induction motor by using converters and inverters (V/F control)
	2ND	Working of UPS with block diagram
	3RD	Battery charger circuit using SCR with the help of a diagram.
	4th	Basic Switched mode power supply (SMPS) - explain its working & applications
8TH	1ST	Introduction of Programmable Logic Controller(PLC)
	2ND	Advantages of PLC Different parts of PLC by drawing the Block diagram
	3RD	purpose of each part of PLC In the Block diagram
	4th	Different parts of PLC by drawing the Block diagram and purpose of each part of PLC. 5.4 Applications of PLC
9TH	1ST	Description of contacts and coils in the following states i)Normally open ii) Normally closed iii) Energized output
	2ND	iv)latched Output v) branching PLC Instruction set
	3RD	Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate. Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
	4th	Timers-i)T ON ii) T OFF and iii)Retentive timer
10TH	1ST	Counters-CTU, CTD Ladder diagrams using Timers and counters
	2ND	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	3RD	Special control systems- Basics DCS & SCADA systems
	4th	Computer Control–Data Acquisition, Direct Digital Control System (Basics only)

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