

Programme Structure

SCHOOL OF ENGINEERING & TECHNOLOGY

Diploma in Electrical Engineering

Programme Code: 0103

Batch: 2023-2026

To be recognized as an Institution of excellence, facilitating learning, fostering creativity,

Vision of the University

To be recognized as an Institution of excellence, facilitating learning, fostering creativity, knowledge creation, innovations, consultancy and leadership in multiple areas to build a conscious community that will positively impact living beings for a sustainable future.

Mission of the University

1. Offers a wide range of Undergraduate and Post graduate Courses.

To create conducive environment for an interactive and application oriented experiential learning making the Institute a preferred destination for work and study.

2. Research, Innovation, Consultancy & Entrepreneurial Culture

To Foster creativity, research and innovation orientation in students and faculty in basic and applied areas in all of its disciplines, provide cost effective solutions and nurture entrepreneurial capabilities to accelerate growth.

3. Social Relevance with local actions on global thoughts

To act as a catalyst in social change by developing academic, social, political, technological, scientific, industrial and business leadership in the spirit “Think Globally and Act Locally”; by providing ample opportunities to develop team spirit, sportsmanship and love for culture and national heritage.

Core Values

Integrity
Leadership

Vision of the School of Polytechnic

To become a center of excellence for providing quality and value based education in the field of diploma engineering that will produce skilled technocrats to meet industry requirements.

Mission of the School of Polytechnic

- To provide technical knowledge and skills by using latest engineering tools.
- To facilitate industry-institute interaction to explore the industrial knowledge of the students.
- To inculcate ethical and professional values among students.
- To impart quality education to the students coming from rural parts and to conduct different curricular & co-curricular activities to enhance the academic.

Core Values

Integrity
Leadership
Diversity
Community

Programme Educational Objectives (PEO's)

PEO 1. To provide solid foundation in electrical engineering along with good communication and entrepreneurship skills for tackling social issues.

PEO 2. To impart students with good scientific and engineering knowledge in order to analyse, design and create novel products for giving practical solutions to real life problems.

PEO 3. To create engineers with sound technical knowledge for facing all sorts of challenges in industry or in pursuance of higher studies.

PEO 4. To motivate students, to acquire aptitude for lifelong learning along with leadership skills, team spirit and ethical values so that they upgrade themselves with the latest trends in the field of engineering in order to serve the society.

PROGRAMME OUTCOMES (POs)

- PO 1.** Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
- PO 2.** Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.
- PO 3.** Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.
- PO 4.** Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.
- PO 5.** Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.
- PO 6.** Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
- PO 7.** Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

- PSO 1.** An ability to specify, design and analyse systems that efficiently generate, transmit, distribute and utilize electrical power.
- PSO 2.** An ability to analyse and design electrical machinery, electrical/electronic circuits, electrical/solid state drive systems, lighting systems and deliver technological solution by assimilating advances in allied disciplines.
- PSO 3.** An ability to specify, design, implement and test analog and embedded signal processing electronic systems using the state of the art components and software tools.
- PSO 4.** An ability to analyse, design and implement the learning in electrical instrumentation, control and automation applications.



SDGI GLOBAL UNIVERSITY, GHAZIABAD

SCHOOL OF ENGINEERING & TECHNOLOGY

SCHEME OF STUDIES AND EVALUATION FOR DIPLOMA IN ELECTRICAL ENGINEERING

W.E.F : Session- 2025-26

(Batch : 2023-2026)

Semester - V

S. No	Status	Paper Code	Subjects	Study Scheme Lec / Week			Hours	Credits	CIE	ESE	Total	Pass Marks
				L	T	P						
1	DC	D061023501	Switchgear and Protection	3	1	0	4	3	50	50	100	40
2	DC	D061023502	PLC, Microcontroller and SCADA	3	1	0	4	3	50	50	100	40
3	DC	D061023503	Electrical Machines - II	3	1	0	4	3	50	50	100	40
4	DE	D061023504/ D061023505/ D061023506	Elective: Renewable Sources of Energy Electric Traction Control of Electrical Machines	3	0	0	3	3	50	50	100	40
5	SE	D06SE24505	Industrial Management and Entrepreneurship Development	3	0	0	3	3	50	50	100	40
6	DC	D061023552	PLC, Microcontroller and SCADA Lab	0	0	2	2	1	60	40	100	40
7	DC	D061023553	Electrical Machines - II Lab	0	0	4	4	2	60	40	100	40
8		D061023560	Summer Internship or Industrial training	0	0	0	0	2	0	100	100	40
Total				15	3	6	24	20	370	430	800	320

Semester 5th



JUSTIFICATION

In view of the complexities associated with the modern interconnected power stations, the responsibilities and the job requirements of a diploma pass outs have become more complex than what they used to be earlier. He is required to work with modern electrical equipment and maintain reliability of supply.

The course is designed to develop understanding of the principles and working of protective switchgear so that one can handle, install and maintain them and also take decisions at his level in different situations. This subject teaching requires reinforcement from visits to substations, power stations and well-designed laboratory experiences. A practical orientation to the teaching of this subject is suggested.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:

- Assess type of fault diagnosis
- Know circuit breaker operation
- Know relay operation
- Know read about protection schemes
- Know about different types of substations and read single line diagrams

DETAILED CONTENTS

UNIT 1: Faults	08 Hours
1.1 Types of faults, three phase symmetrical faults, effects of faults on system reliability and stability, abnormalities, short circuits and their effects, representation of fault conditions through single line diagrams	
UNIT2: Switchgear	10 Hours
2.1 Purpose of protective gear, characteristics of a protection system.	
2.2 Classification of fuses H.V. Fuses, application and working, grading and coordination L.V. fuses, selection of fuses, characteristics	
2.3 Isolators and switches, outdoor isolators, functions, air break switches, braking capacity of switches.	
2.4 Circuit breakers :- requirements of circuit breakers, definition of terms associated with circuit-breakers, reasons for arc formation, principles of arc extinction, types of circuit-breakers, comparison with oil circuit breaker, classification, rating of circuit breakers, working of different types of air and oil circuit breakers, specification of circuit breakers, maintenance schedule, SF6 and Vacuum circuit breakers.	
2.5 Relays: Requirement of relays, operation principles, induction type over current, directional over current, differential, percentage differential relays working, applications and characteristics, basic principles of static relays. Introduction too distance relay.	
UNIT3: Protective Schemes	10 Hours
3.1 Protection of alternators, stator faults, and rotor faults, mechanical conditions, external faults - their reasons, effect and protections used.	
3.2 Protection of power transformer: types of faults, its effects, types of protective schemes over current, earth fault, differential protection, Buckholtz devices, winding temp. Protection.	
3.3 Motor protection: types of faults and protection in motors, thermal relays, protection of small motors, under voltage protection.	

3.4	Protection of feeders: radial, parallel and ring feeders protection, directional time and current graded schemes, differential protection.	
UNIT4:	Protection Against Over Voltages	08 Hours
4.1	Causes of over voltages, travelling wave's earth wire, protective zone, lightning arrestors, space-gap and electrolytic arrestors, surge absorber, location and rating of lightning arrestors. Thyrite lightning arrestor	
UNIT5:	Different Type of Sub-stations	08 Hours
5.1	Layout, single line diagram, busbar arrangement, equipment, their functions, accessories, study of protective schemes, batteries and their maintenance, operation of small sub-stations.	
5.2	5.2 Reactors: types of reactors, busbar reactor, tuning reactor, arc-suppression reactor, connection of reactors in power stations, uses of reactors.	
5.3	Neutral grounding:- types of grounding solid grounding, reactance grounding, arc suppression, coil grounding, choice of method of neutral earthing, grounding of sub-stations, grounding of line structure and substation equipment.	
5.4	Concept of G.I.S. (Gas Insulated Substation)	

RECOMMENDED BOOKS

1. Switchgear and Protection by Nagrath Kathan; TMH
2. Switchgear and Protection by Soni Gupta & Bhatnagar; Dhanpat Rai & Sons
3. Switchgear and Protection by Sunil S. Rao; Dhanpat Rai & Sons
4. Switchgear and Protection by Harnoon Asfaq Hussain; Khanna Publications
5. Switchgear and Protection by J.B. Gupta; Kataria & Sons



JUSTIFICATION

A diploma holder, employed in automated industrial process controls or in automated power station, will be required to know the basic of programmable logic controllers, their working and their programming. In industry, many manufacturing processes demand a sequence of operation, which are to be performed repetitively. Early automation system was mechanical in design, timing and sequencing being effected by gears and cams. Now this design concept was replaced by programmable logic controllers (PLC). A PLC is a solid state device. PLCs are widely used in all industries for efficient control operations. Looking at the industrial applications of PLCs in the industry, this subject finds its usefulness in present curriculum. Microcontrollers and SCADA have also assumed great significance in the field of electronics, power system, large industry and engineering field. This subject aims to expose the diploma students to both of these and give them adequate knowledge of these topics.

DETAILED CONTENTS

UNIT 1: Introduction	08 Hours
1.1 Concept of PLC, building block of PLC, function of various blocks, limitation of relays, advantage of PLC over electromagnetic relays, different programming languages, PLC manufacturer, working of PLC, basic operation and principles of PLC, architectural details	
UNIT2: Instruction Set	10 Hours
2.1 Basic instructions like latch, master control self-holding relays, timer instruction like retentive timers, resetting of timers, counter instructions like up counter, resetting of counters.	
2.2 Ladder Diagram Programming: programming based on basic instructions, timer, counter, sequencer, and comparison instructions using ladder program.	
UNIT3: Microcontroller series (MCS)-51 over view	10 Hours
3.1 Pin details, I/O ports structure, memory organisation, special function registers instruction set, addressing modes, timers operation, serial port operation, interrupts.	
UNIT4: Assembly language programming	08 Hours
4.1 Assemblers and Compilers, assembler directives, design and interface. Examples like: keypad interface, 7- segment interface, LCD, Stepper motor, A/D, D/A, RTC interface, introduction of PIC microcontrollers.	
UNIT5: SCADA	08 Hours
5.1 Introduction, role of SCADA in dispatch centre, operator console, VDUs, types of communication channels in SCADA systems, RTUs, MTUs, data loggers, report generation, report analysis and actions.	

RECOMMENDED BOOKS

1. Introduction to PLCs by Gary Dunning, McGraw Hill.
2. Module on PLCs and their applications by Rajesh Kumar, NITTTR Chandigarh.
3. Micro controller by Ayala, Pen ram International
4. Power system SCADA and smart Grids by Mini S. Thomas and John D. McDonald



SCHOOL OF ENGINEERING & TECHNOLOGY

ELECTRICAL MACHINES- II

(D061023503)

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3 1 0

JUSTIFICATION

Electrical machines is a subject where a student will deal with various types of electrical machines which are employed in industries, power stations, domestic and commercial appliances etc. After studying this subject, an electrical diploma holder must be competent to repair and maintain these machines and give suggestions to improve their performance. Explanation of practical aspects of the subject will make the students capable of performing various tests on the machines as per latest BIS specifications.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:

1. Demonstrate the constructional features of a synchronous machine and its working as a synchronous motor
2. Operate the synchronous motor as synchronous condenser
3. Use 3- ϕ induction motor in the industry for various operations
4. Operate and maintain three phase squirrel cage and three phase slip ring induction motors.
5. Start and reverse the direction of rotation of three phase induction motors using different types of starters.
6. Conduct speed control of three phase induction motor.
7. Operate and maintain double cage induction motors.
8. Recognize the condition of cogging and crawling in three phase induction motors.
9. Operate different types of single phase induction motors.
10. Operate different types of special purpose motors.

DETAILED CONTENTS

UNIT 1: 3 Phase Induction Motors-1	10 Hours
1.1 Production of rotating magnetic field in 3 phases winding.	
1.2 Salient constructional features of squirrel cage and slip ring 3-phase induction motors	
1.3 Principle of operation, slip and its significance	
1.4 Locking of rotor and stator fields motor	
1.5 Rotor resistance, inductance, emf and current	
1.6 Relationship between rotor copper losses, slip and rotor input power.	
1.7 Power flow diagram of an induction motor	
1.8 Factors determining the torque	
1.9 Torque-slip curve, stable and unstable zones	
1.10 Effect of rotor resistance upon the torque slip curve	
UNIT 2: 3 Phase Induction Motors-2	08 Hours
2.1 Double cage rotor motor and its applications	
2.2 Starting of 3-phase induction motors, DOL, star-delta, auto transformer starter.	
2.3 Causes of low power factor of induction motors	
2.4 Testing of 3-phase motor on no load and blocked rotor test and to find efficiency	
2.5 Method of Speed control of induction motor	
2.6 Harmonics and its effects, cogging and crawling in Induction Motors.	
2.7 Specifications and ratings of induction motors.	

UNIT3: Single Phase Motors	10 Hours
3.1	Single phase induction motors; Construction characteristics, specifications and applications.
3.2	Nature of field produced in single phase induction motor-double revolving field theory.
3.3	Split phase induction motor: 1) Capacitor start, capacitor run, capacitor start and run motor 2) Shaded pole motor
3.4	Alternating current series motor and universal motors, construction, working principle and operation, application
3.5	Single phase synchronous motor : 1) Reluctance motor 2) Hysteresis motor
UNIT4: Synchronous Machines	10 Hours
4.1	Main constructional features of synchronous machine including commutator and brushless excitation system
4.2	Generation of three phase emf
4.3	Concept of distribution factor and coil span factor and emf equation Armature reaction at unity, lag and lead power factor
4.4	Equivalent circuit diagram of synchronous machine
4.5	Concept of voltage regulation. Determination of voltage regulation by synchronous impedance method.
4.6	Operation of single synchronous machine independently supplying a load.
4.7	Concept of infinite bus bar. Need and necessary conditions of parallel operation of alternators, synchronizing an alternator (Synchroscope method) with the bus bars
4.8	Effect of change in excitation of a synchronous motor, V curve, Concept of synchronous condenser.
4.9	Operation of synchronous machine as a motor –its starting methods
4.10	Concept and cause of hunting and its prevention
4.11	Specification, rating and cooling of synchronous machines
4.12	Applications of synchronous machines
UNIT5: Special Purpose Machines	06 Hours
5.1	Construction, working principle and application of linear induction motor, stepper motor, AC Servomotor, Submersible Motor.

RECOMMENDED BOOKS

1. Electrical Machines by SK Bhattacharya; Tata McGraw Hill, New Delhi
2. Electrical Machine by B.L.Thareja; S.ChandPublicaion, New Delhi
3. Electrical Machines by SK Sahdev; Uneek Publications, Jalandhar
4. Electrical Machines by Nagrath and Kothari; Tata McGraw Hill, New Delhi
5. Electrical Engineering by JB Gupta; SK Kataria and sons, New Delhi
6. Electrical Machines by Samarjit Ghosh; Pearson Education (Singapore) Pvt, Ltd. Delhi



JUSTIFICATION

Since the conventional energy resources are under fast depletion, it is high time to tap the nonconventional energy sources also. So, the solution primarily lies in tapping all possible energy generation sources but efficient use of available energy is also important. The electrical diploma holder must be made aware about saving and conserving Electrical Energy and tackle the problems of environmental pollution as they will have to face this challenge in future life.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

1. Explain the importance of non-conventional energy sources for the present energy scenario.
2. Classify various non-conventional sources of energy
3. Explain principle of solar photovoltaic energy conversion and the applications of solar energy in different fields.
4. Explain basic conversion technologies of biomass, wind energy, geo-thermal, tidal energy, hydro energy and its applications.
5. Explain direct energy conversion systems like magneto hydrodynamics and fuel cells and its applications.

DETAILED CONTENTS

UNIT 1: Basic of Energy	08 Hours
1.1 Classification of Energy-primary and secondary energy, commercial and noncommercial energy, importance of non-conventional energy sources, present scenario, future prospectus, energy scenario in India, sector-wise energy consumption(domestic, industrial, agriculture etc.), comparison between renewable and non-renewable energy resources.	
UNIT2: Solar Energy	08 Hours
2.1 Principle of conversion of solar radiation into heat, using different types of solar collectors, photo-voltaic cell, electricity generation, application of solar energy like solar water heaters, solar furnaces, solar cookers, solar lighting, solar pumping, installation & maintenance of solar power plant.	
UNIT3: Bio-Energy and Wind Energy	08 Hours
3.1 Bio-mass conversion technologies& their types- wet and dry processes. Methods for obtaining energy from biomass. Power generation by using gasifiers	
3.2 Wind energy conversion, windmills, electricity generation from wind- types of wind mills, local control, energy storage	
UNIT4: Geo-thermal and Tidal Energy	06 Hours
4.1 Geo-thermal sources, Ocean thermal electric conversion, open and closed cycles, hybrid cycles. Prime movers for geo-thermal energy conversion. Steam Generation and electricity generation. Different types of tidal energy systems.	
Unit 5: MHD, Fuel cell and Hydro Energy	06 Hours
5.1 Magneto Hydro Dynamic (MHD) Power Generation	
5.2 Concept, types of fuel cells, operating principles of a fuel cell, conversion	

efficiency, work output and e.m.f of fuel cells, applications.

5.3 **Hydro Energy** : Mini & Micro hydro plants

RECOMMENDED BOOKS

1. Non-Conventional Energy Resources by RK Singal; SK Kataria and Sons, New Delhi
2. Solar Energy Utilization; GD Rai; Khanna Publishers, New Delhi.
3. Reviews of Renewable Energy Sources, Vol. 3, Edited by MS Sodha, S.S. Mathur, MAS Malik, TC Kandpal ; Wiley Eastern Limited, New Delhi.
4. Renewable Energy Sources and Conversion Technology by NK Bansal, Manfred Kleemann, Michael Meliss; Tata McGraw Hill Publishing Co. Ltd New Delhi.
5. Energy Today and Tomorrow; Maheshwar Dayal; Publications Division, Ministry of Information and Broadcasting, Govt. of India, New Delhi.
6. Energy Technology (Non-Conventional, Renewable and Conventional) by S Rao and BB Parulekar; Khanna Publishers, New Delhi
7. e-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR.



SCHOOL OF ENGINEERING & TECHNOLOGY
INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP
DEVELOPMENT

(D06SE24505)

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JUSTIFICATION

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. It may be further added that an entrepreneurial mindset with managerial skills helps the student in the job market. This subject focuses on imparting the necessary competencies and skills of enterprise set up and its management.

LEARNING OUTCOMES

After undergoing this course, the students will be able to:

- Know about various schemes of assistance by entrepreneurial support agencies
- Conduct market survey
- Prepare project report
- Explain the principles of management including its functions in an organization.
- Have insight into different types of organizations and their structures.
- Inculcate leadership qualities to motivate self and others.
- Manage human resources at the shop-floor
- Maintain and be a part of healthy work culture in an organization.
- Use marketing skills for the benefit of the organization.
- Maintain books of accounts and take financial decisions.
- Undertake store management.
- Use modern concepts like TQM, JIT and CRM.

DETAILED CONTENTS

UNIT 1:	ENTREPRENEURSHIP	06
		Hours
1.1	Introduction: Concept /Meaning and its need	
1.2	Qualities and functions of entrepreneur and barriers in entrepreneurship	
1.3	Sole proprietorship and partnership forms and other forms of business organization's	
1.4	Schemes of assistance by entrepreneurial support agencies at National, State, District –level, organization: NSIC, NRDC, DC, MSME, SIDBI, NABARD, NIESBUD, HARDICON Ltd., Commercial Banks, SFC's TCO, KVIB, DIC, Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks	
UNIT2:	Market Survey and Opportunity Identification/Ideation	08
		Hours
2.1	Scanning of the business environment	
2.2	Salient features of National and Haryana State industrial policies and resultant business opportunities	
2.3	Types and conduct of market survey	
2.4	Assessment of demand and supply in potential areas of growth	
2.5	Identifying business opportunity	
2.6	Considerations in product selection	
2.7	Converting an idea into a business opportunity	
2.8	Project report Preparation : Preliminary project report	
2.9	Detailed project report including technical, economic and market feasibility	

2.10	Common errors in project report preparations	
2.11	Exercises on preparation of project report	
2.12	Sample project report	
UNIT3:	Introduction to Management	08 Hours
3.1	Definitions and importance of management	
3.2	Functions of management: Importance and process of planning, organising, staffing, directing and controlling	
3.3	Principles of management (Henri Fayol, F.W. Taylor)	
3.4	Concept and structure of an organisation	
3.5	Types of industrial organisations and their advantages	
3.6	Line organisation, staff organisation	
3.7	Line and staff organisation	
3.8	Functional organisation	
3.9	Leadership: Definition and Need, Qualities and functions of a leader, Manager Vs leader, Types of leadership, Case studies of great leaders	
3.10	Motivation: Definition and characteristics, Importance of self-motivation, Factors affecting motivation, Theories of motivation (Maslow, Herzberg, Douglas, McGregor)	
UNIT4:	Management Scope in Different Areas	08 Hours
4.1	Human Resource Management: Introduction and objective, Introduction to Man power planning, recruitment and selection, Introduction to performance appraisal methods	
4.2	Material and Store Management: Introduction functions, and objectives, ABC Analysis and EOQ	
4.3	Marketing and sales: Introduction, importance, and its functions, Physical distribution, Introduction to promotion mix, Sales promotion	
4.4	Financial Management: Introductions, importance and its functions, knowledge of income tax, sales tax, excise duty, custom duty, VAT, GST	
4.5	Work Culture : Introduction and importance of Healthy Work Culture in organization	
4.6	Components of Culture	
4.7	Importance of attitude, values and behavior	
4.8	Behavioral Science – Individual and group behavior.	
4.9	Professional ethics – Concept and need of Professional Ethics and human values	
UNIT5:	Basic of Accounting and Finance	08 Hours
5.1	Basic of Accounting: Meaning and definition of accounting, Double entry system of book keeping, Trading account, PLA account and balance sheet of a company	
5.2	Objectives of Financial Management: Profit Maximization v/s Wealth Maximization	
5.3	Miscellaneous Topics : Total Quality Management (TQM): Statistical process control, Total employees Involvement, Just in time (JIT)	
5.4	Intellectual Property Right (IPR) : Introduction, definition and its importance, Infringement related to patents, copy right, trade mark	

RECOMMENDED BOOKS

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development and Management by J.S.Narang; Dhanpat Rai & Sons, Delhi.
3. Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi
4. Handbook of Small Scale Industry by PM Bhandari
5. Entrepreneurship Development and Management by MK Garg
6. E-books/e-tools/relevant software to be used as recommended by AICTE/ NITTTR, Chandigarh.



SCHOOL OF ENGINEERING & TECHNOLOGY

PLC, SCADA AND MICROCONTROLLER LAB

(D061023552)

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JUSTIFICATION

A diploma holder, employed in automated industrial process controls or in automated power station, will be required to know the basic of programmable logic controllers, their working and their programming. In industry, many manufacturing processes demand a sequence of operation, which are to be performed repetitively. Early automation system was mechanical in design, timing and sequencing being effected by gears and cams. Now this design concept was replaced by programmable logic controllers (PLC). A PLC is a solid state device. PLCs are widely used in all industries for efficient control operations. Looking at the industrial applications of PLCs in the industry, this subject finds its usefulness in present curriculum. Microcontrollers and SCADA have also assumed great significance in the field of electronics, power system, large industry and engineering field. This subject aims to expose the diploma students to both of these and give them adequate knowledge of these topics.

DETAILED CONTENTS

- 1 Components / sub components of a PLC, learning functions of different modules of a PLCs
- 2 Practical steps in programming a PLC (a) using hand held programmer (b) using computer interface.
- 3 Introduction to step programming language, ladder diagram concepts, instruction list syntax.
- 4 Basic logic operations, AND, NOT, OR functions
- 5 Use of PLC for an application Car parking, doorbell operation, traffic light control, washing machine, motor in forward and reverse direction
Microcontrollers.
- 6 Familiarization of micro controllers (8051) kit.
- 7 Testing of general input/ output on micro controller board
- 8 Use of micro controller liken in relays, buzzer of working machine, oven



JUSTIFICATION

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LEARNING OUTCOMES

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5. Start and reverse the direction of rotation of three phase induction motors using different types of starters.
6. Conduct speed control of three phase induction motor.
7. Operate and maintain double cage induction motors.
8. Recognize the condition of cogging and crawling in three phase induction motors.
9. Operate different types of single phase induction motors.

DETAILED CONTENTS

- 1 Determination of efficiency by (a) no load test and blocked rotor test on an induction motor (b) direct loading of an induction motor (refer BIS code)
- 2 Determination of effect of rotor resistance on torque speed curve of an induction motor Observe the performance of a ceiling fan (I- ϕ induction motor) without capacitor
- 3 Determine the effect of change in capacitor on the performance of 1-phase induction motor and reverse the direction of motor.
- 4 To plot relationship between no load terminal voltage and excitation current in a synchronous generator at constant speed
- 5 Determination of the relationship between the voltage and load current of an alternator, keeping excitation and speed constant
- 6 Determination of the regulation and efficiency of alternator from the open circuit and short circuit test
- 7 Determination of the effect of variation of excitation on performance of a synchronous motor



SCHOOL OF ENGINEERING & TECHNOLOGY
SUMMER INTERNSHIP/INDUSTRIAL TRAINING
(D061023560)

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JUSTIFICATION

It is needless to emphasize further the importance of Industrial Training of students during their 3 years of studies at Polytechnics. It is industrial training, which provides an opportunity to students to experience the environment and culture of industrial production units and commercial activities undertaken in field organizations. It prepares student for their future role as diploma engineers in the world of work and enables them to integrate theory with practice. Polytechnics have been arranging industrial training of students of various durations to meet the above objectives.

This document includes guided and supervised industrial training of 4 weeks duration to be organised during the semester break starting after second year i.e. after 4th semester examinations. The concerned HODs along with other teachers will guide and help students in arranging appropriate training places relevant to their specific branch. It is suggested that a training schedule may be drawn for each student before starting of the training in consultation with the training providers. Students should also be briefed in advance about the organizational setup, product range, manufacturing process, important machines and materials used in the training organization.

Equally important with the guidance is supervision of students training in the industry/organization by the teachers. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An external assessment of 50 marks has been provided in the study and evaluation scheme of 5th Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

Teachers and students are requested to see the footnote below the study and evaluation scheme of 4th semester for further details. The teacher along with field supervisors will conduct performance assessment of students. The components of evaluation will include the following:

- a) Punctuality and regularity 15%
- b) Initiative in learning new things 15%
- c) Presentation and VIVA 15%.
- d) Industrial training report 55%