

FACULTY OF SCIENCES

SYLLABUS FOR THE BATCH FROM THE YEAR 2024 TO YEAR 2025

Programme Code: DEL

Programme Name: Certificate/ Diploma:

Electrician

(Semester I-II)

Examinations: 2024-25



Department of Physics

Khalsa College, Amritsar

(An Autonomous College)

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(b) Subject to change in the syllabi at any time.
(c) Please visit the college website time to time.

Diploma: Electrician (2024-25)

S.NO.	PROGRAMME OBJECTIVES
1.	To undergo training in electrical wiring; carry out soldering, crimping and measure insulation resistance of electric circuits and underground cables.
2.	To evaluate the process of testing, verify errors and calibrate electronic instruments.

S.NO.	PROGRAMME SPECIFIC OUTCOMES (PSOs)
PSO-1	To plan and perform experiments and practices on electrical instruments.
PSO-2	To know about the basics of electrical and magnetic circuits and repair of electronic instruments.
PSO-3	To measure, Assemble, install and test wiring system.
PSO-4	To Plan and prepare Earthing installation and power of battery.
PSO-5	To Demonstrate basic electrical circuits in practical operations.

ELIGIBILITY: A candidate who has passed 10+2 Arts/Commerce/Science examination from recognized board or any other examination considered equivalent by the GNDU with 35% marks is eligible to apply (subject to change).

COURSE DURATION: 1 Year

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COURSE SCHEME										
SEMESTER-I										
Course Code	Course Title	Credits			Total Credits	Max. Marks				Page No.
		L	T	P		Th	P	IA	Total Marks	
DEL-111	Electricity and safety precautions	2	0	0	2	37		13	50	3-4
DEL-112	Electrical circuits	2	0	0	2	37		13	50	5-6
DEL-113	Batteries and cells	2	0	0	2	37		13	50	7-8
DEL-114	Practical lab I	0	0	4	4		75	25	100	9-10
DEL-115	Practical lab II	0	0	4	4		75	25	100	11-12
DEL-116	Computer Lab-I	0	0	2	2		37	13	50	13-14
					16				400	
SEMESTER-II										
Course Code	Course Title	Credits			Total Credits	Max. Marks				Page No.
		L	T	P		Th	P	IA	Total Marks	
DEL-121	Wiring and earthing	2	0	0	2	37		13	50	15-16
DEL-122	Electrical measurements	2	0	0	2	37		13	50	17-18
DEL-123	Installation and maintenance	2	0	0	2	37		13	50	19-20
DEL-124	Practical lab III	0	0	4	4		75	25	100	21-22
DEL-125	Training/ workshop	0	0	4	4		75	25	100	23
DEL-126	Computer Lab- II	0	0	2	2		37	13	50	24-25
					16				400	

SEMESTER-I
DEL-111
ELECTRICITY AND SAFETY PRECAUTIONS
(THEORY)

Time: 3 Hours

Credits LTP:200
Maximum Marks: 50
(Theory Marks: 37+ Internal Assessment: 13)
Pass Marks: 35%

Note for paper setter and students:

- 1. There will be three sections.**
- 2. Section A carries 9 marks and is compulsory consisting of eight short answer type questions of 1.5 marks each covering the whole syllabus. The candidate will have to attempt any six questions in section A.**
- 3. Sections B and C will be set from units I & II respectively and will consist of four questions of 7 marks each from the respective unit. The candidates are required to attempt two questions from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

Course Objectives:

The main objective of this course is to make students familiar with the concept of electricity and safety precautions while working on electrical circuits. It further aims to make them to understand the basic current measurements and testing of wires.

Course Contents:

UNIT-I

Fundamentals of electricity, definitions, units & effects of electric current. Safety rules and safety signs. Types and working of fire extinguishers. Hazard identification and prevention. Response to emergencies e.g. power failure, system failure and fire etc. Concept of Standards and advantages of BIS/ISI. Introduction to fitting tools and their safety precautions. Description of files, hammers, chisels hacksaw frames, blades, their specification and grades.

UNIT-II

Conductors and insulators. Conducting materials and their comparison. Prepare electrical wire joints, carry out soldering, crimping and measure insulation resistance of underground cable. Joints in electrical conductors. Techniques of soldering. Types of solders and flux. Underground cables: Description, types, various joints and testing procedure. Cable insulation & voltage grades. Precautions in using various types of cables.

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Books Prescribed:

1. Electrical Engineering by B. L. Thareja.
2. Ugly's Electrical References by George V. Hart, Publication: Jones & Bartlett Learning.
3. Electrical Trainee Guide, Level 1, Pearson Publication.

Course Outcomes	On completing the course, the students will be able to:
CO1	Know about the basics of electricity and current.
CO2	Know about the tools and safety precautions.
CO3	Understand soldering techniques.
CO4	Understand the working of conductors and insulators.
CO5	Know the difference between various types of electrical cables.

SEMESTER-I
DEL-112
ELECTRICAL CIRCUITS
(THEORY)

Time: 3 Hours

Credits LTP:200

Maximum Marks: 50

(Theory Marks: 37+ Internal Assessment: 13)

Pass Marks: 35%

Note for paper setter and students:

- 1. There will be three sections.**
- 2. Section A carries 9 marks and is compulsory consisting of eight short answer type questions of 1.5 marks each covering the whole syllabus. The candidate will have to attempt any six questions in section A.**
- 3. Sections B and C will be set from units I & II respectively and will consist of four questions of 7 marks each from the respective unit. The candidates are required to attempt two questions from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

Course Objectives: The objectives of this course are to introduce students with different electric and magnetic circuits to monitor, analyze and control electrical system. It also aims to understand the function of resistors, capacitors and inductors to use them in electrical projects.

Course Contents:

UNIT-I

Ohm's Law; Simple electrical circuits and problems. Kirchoff's Laws and applications. Series and parallel circuits. Open and short circuits in series and parallel networks. Laws of Resistance and various types of resistors. Wheatstone bridge; principle and its applications. Effect of variation of temperature on resistance. Different methods of measuring the values of resistance. Series and parallel combinations of resistors. Magnetic terms, magnetic materials and properties of magnet.

UNIT-II

Principles and laws of electro-magnetism. Self and mutually induced EMFs. Electrostatics: Capacitor- Different types, functions, grouping and uses. Inductive and capacitive reactance, their effect on AC circuit and related vector concepts. Comparison and Advantages of DC and AC systems. Related terms frequency, Instantaneous value, R.M.S. value Average value, Peak factor, form factor, power factor and Impedance etc. Sine wave, phase and phase difference.

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Active and Reactive power. Single Phase and three-phase system. Problems on A.C. circuits.
Advantages of AC poly-phase system.

Books Prescribed:

1. Electrical and Electronic measurements by A. K. Sawhney.
2. Basic Electronics and Linear Circuits by N.N. Bhargava, D.C. Kulshreshtha and S.C. Gupta.
3. Electrical Trainee Guide, Level 1, Pearson Publication.
4. Electrician's Troubleshooting and Testing Pocket Guide by Brook Stauffer, John Traistor, Publication: McGraw-Hill.

Course Outcomes	On completing the course, the students will be able to:
CO1	Understand the working of different series and parallel circuits.
CO2	Learn about the multimeter and its specifications to measure different Parameters in electronics.
CO3	Measure DC voltage, DC current, AC voltage, AC current and resistance using multimeter.
CO4	Know about single phase and three phase electric system.
CO5	Understand the problems in AC circuit.

SEMESTER-I
DEL-113
BATTERIES AND CELLS
(THEORY)

Time: 3 Hours

Credits LTP:200

Maximum Marks: 50

(Theory Marks: 37+ Internal Assessment: 13)

Pass Marks: 35%

Note for paper setter and students:

- 1. There will be three sections.**
- 2. Section A carries 9 marks and is compulsory consisting of eight short answer type questions of 1.5 marks each covering the whole syllabus. The candidate will have to attempt any six questions in section A.**
- 3. Sections B and C will be set from units I & II respectively and will consist of four questions of 7 marks each from the respective unit. The candidates are required to attempt two questions from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

Course Objectives: The objectives of this course are to explain the basic concepts of batteries and cells, chemical effects and electrolysis. It also aims to understand the principal of solar cell, charging and grouping of cells.

Course Contents:

UNIT-I

Install, test and maintenance of batteries and solar cell. Chemical effect of electric current and Laws of electrolysis. Explanation of Anodes and cathodes. Types of cells, advantages / disadvantages and their applications.

UNIT-II

Lead acid cell; Principle of operation and components. Types of battery charging, Safety precautions, test equipment and maintenance. Basic principles of Electro-plating and cathodic protection. Grouping of cells for specified voltage and current. Principle and operation of solar cell, Lithium Ion Batteries: Materials, working & manufacturing, Super capacitors: Basics, principle & types. Comparison of supercapacitors & Lithium ion batteries.

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Books Prescribed:

1. Electrical Engineering by B. L. Thareja
2. Ugly's Electrical References by George V. Hart, Publication: Jones & Bartlett Learning.
3. American Electrician's Handbook by Frederick Hartwell, Publication: McGraw-Hill Education.
4. Electrical Trainee Guide, Level 1, Pearson Publication.

Course Outcomes	On completing the course, the students will be able to:
CO1	Understand how to install, test and maintenance of batteries.
CO2	Know about the basics of anodes and cathodes.
CO3	Understand the principle of charging and discharging.
CO4	Learn about the grouping of cells.
CO5	Understand the principle of solar cell.

SEMESTER-I
DEL-114
PRACTICAL LAB I
(PRACTICAL)

Time: 3 Hours

Credits:LTP:004
Maximum Marks: 100
(Practical Marks: 75+ Internal Assessment: 25)
Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows:

- i) One experiment: **30 Marks**
- ii) Brief Theory: **10 Marks**
- iii) Viva–Voce: **20 Marks**
- iv) Record (Practical file): **15 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session. Paper will consist of 6 experiments out of which an examinee will mark 4 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: The main objective of this course is to instill the basic experimental skills in the students. This course will provide the hands on experience to the basic instruments, tools and soldering techniques.

Course Contents:

1. Prepare terminations of cable ends, Practice on skinning, twisting and crimping.
2. Identify various types of cables and measure conductor size using SWG and micrometer.
3. Practice in Soldering of joints / lugs.
4. Practice on measurement of parameters in combinational electrical circuit by applying Ohm's Law for different resistor values and voltage sources and analyse by drawing graphs.
5. Measure current and voltage in electrical circuits to verify Kirchoff's Law.
6. Verify law of series and parallel circuits with voltage source in different combinations.
7. Measure voltage and current against individual resistance in electrical circuit.
8. Measure current and voltage and analyse the effects of shorts and opens in series and parallel circuit.
9. Measure resistance using voltage drop method.

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10. Measure resistance using wheatstone bridge.
11. Determine the thermal effect of electric current.
12. Determine the change in resistance due to temperature

Books Prescribed:

1. Electrical Engineering by B. L. Thareja
2. Practical Physics, C.L. Arora, S. Chand & Co
3. Ugly's Electrical References by George V. Hart, Publication: Jones & Bartlett Learning.
4. Electrical Trainee Guide, Level 1, Pearson Publication.

Course Outcomes	On completing the course, the students will be able to:
CO1	measure the parameters of combinational electrical circuits.
CO2	measure resistance using voltage drop and wheatstone bridge.
CO3	determine change in resistance with temperature.
CO4	Work on Soldering of joints / lugs.
CO5	Work on skinning, twisting and crimping various types of cables and measure conductor size using SWG and micrometer.

SEMESTER-I
DEL-115
PRACTICAL LAB II
(PRACTICAL)

Time: 3 Hours

Credits:LTP:004
Maximum Marks: 100
(Practical Marks: 75+ Internal Assessment: 25)
Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows:

- i) One experiment: **30 Marks**
- ii) Brief Theory: **10 Marks**
- iii) Viva–Voce: **20 Marks**
- iv) Record (Practical file): **15 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 6 experiments out of which an examinee will mark 4 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: Course objective of this subject is to follow the pragmatic way of learning and instill the basic experimental skills in the students. This will provide practical knowledge in electric and magnetic circuits, combination of resistors and grouping of capacitors and resistors.

Course Contents:

1. Verify the characteristics of series parallel combination of resistors.
2. Determine the poles and plot the field of a magnet bar.
3. Wind a solenoid and determine the magnetic effect of electric current.
4. Practice on generation of mutually induced emf. Determine direction of induced emf and current.
5. Measure the resistance, impedance and determine inductance of choke coils in different combinations.
6. Identify various types of capacitors, charging / discharging and testing.
7. Group the given capacitors to get the required capacity and voltage rating.

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8. Measure current, voltage and PF and determine the characteristics of RL, RC and RLC in AC series and parallel circuits.
9. Measure the resonance frequency in AC series and parallel circuit and determine its effect on the circuit.
10. Study of household energy meter.

Books Prescribed:

1. Electrical Engineering by B. L. Thareja
2. Electrical and Electronic measurements by A. K. Sawhney.
3. Basic Electronics and Linear Circuits by N.N. Bhargava, D.C. Kulshreshtha and S.C. Gupta.
4. Foundations of Electronics by D. Chatopadhyay, P.C. Rakshit, B. Saha and N.N. Purkit.
5. Practical Physics, C.L. Arora, S. Chand & Co

Course Outcomes	On completing the course, the students will be able to:
CO1	Setup the apparatus and plot the field of a magnet bar.
CO2	Measure various parameters using series and parallel combination of resistors.
CO3	Identify various types of capacitors, charging / discharging and testing.
CO4	Measure the resonance frequency in AC series and parallel circuit and determine its effect on the circuit
CO5	Understand the household energy meter.

SEMESTER-I

DEL-116

Computer Lab-I

(PRACTICAL)

Time: 3 Hours

Credits:LTP:002

Maximum Marks: 50

(Practical Marks: 37+ Internal Assessment: 13)

Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows:

i) One experiment: **15 Marks**

ii) Brief Theory: **5 Marks**

iii) Viva–Voce: **7 Marks**

iv) Record (Practical file): **10 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session. Paper will consist of 6 experiments out of which an examinee will mark 4 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: This course has been formulated to enhance student's ability/skill to understand the working of Microsoft word.

COURSE CONTENT:

Section-A

General Concept of Ms Word: Overview, Creating, Opening, Editing, Formatting, Spell-Grammar Checking, document Handling, Printing and Saving.

Section-B

Creating table in Ms Word, addition and delete of row and coulum, merging of rows or columns, copy table, adding image to word file.

(PRACTICAL)

Working with Ms Word

BOOKS PRESCRIBED:

1. Computer Fundamentals:-P.K.Sinha
2. Introduction to Computers:- N. Subramanian
3. Introduction to Computers:- Peter Norton Mcgraw Hill

Course Outcomes:

Sr. No.	On completing the course, the students will be able to:
CO1	Understand the world of computer, and information & technology.
CO2	Understand the importance of hardwares and softwares of computers.
CO3	Understand the storage of data, memory devices.
CO4	Understand the applications of computer in our daily life, and in science & technology.
CO5	Understand the basics, working and use of ms word.

SEMESTER-II
DEL-121
WIRING AND EARTHING
(THEORY)

Time: 3 Hours

Credits LTP:200

Maximum Marks: 50

(Theory Marks: 37+ Internal Assessment: 13)

Pass Marks: 35%

Note for paper setter and students:

- 1. There will be three sections.**
- 2. Section A carries 9 marks and is compulsory consisting of eight short answer type questions of 1.5 marks each covering the whole syllabus. The candidate will have to attempt any six questions in section A.**
- 3. Sections B and C will be set from units I & II respectively and will consist of four questions of 7 marks each from the respective unit. The candidates are required to attempt two questions from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

Course Objectives: The objectives of this course are to acquire skills allowing the student to Estimate, Assemble, install and test wiring system, rules on electrical wiring, grading of cables, earthing installation and types. It also aims to understand wiring circuits planning, permissible load in sub-circuit and main circuit.

Course Contents:

UNIT-I

Estimate, Assemble, install and test wiring system. I.E. rules on electrical wiring. Types of domestic and industrial wirings. Study of wiring accessories e.g. switches, fuses, relays, MCB, ELCB, MCCB etc. Grading of cables and current ratings. Principle of laying out of domestic wiring. Voltage drop concept. PVC conduit and Casing-capping wiring system. Different types of wiring - Power, control, Communication and entertainment wiring.

UNIT-II

Wiring circuits planning, permissible load in sub-circuit and main circuit. Estimation of load, cable size, bill of material and cost. Plan and prepare Earthing installation. Importance of Earthing. Plate earthing and pipe earthing methods and IEE regulations. Earth resistance and earth leakage circuit breaker.

Books Prescribed:

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1. Ugly's Electrical References by George V. Hart, Publication: Jones & Bartlett Learning.
2. Ultimate Guide: Wiring by Creative Homeowner.
3. Electrical Trainee Guide, Level 1, Pearson Publication.
4. Wiring a House by Rex Cauldwell, Publication: Taunton Press.

Course Outcomes	On completing the course, the students will be able to:
CO1	Describe the various types of wiring systems.
CO2	Understand the difference between domestic and industrial wiring.
CO3	Understand the wiring circuit planning.
CO4	Plan and prepare Earthing installation.
CO5	Understand the basics of Plate earthing and pipe earthing methods and IEE regulations

SEMESTER-II
DEL-122
ELECTRICAL MEASUREMENTS
(THEORY)

Time: 3 Hours

Credits LTP:200

Maximum Marks: 50

(Theory Marks: 37+ Internal Assessment: 13)

Pass Marks: 35%

Note for paper setter and students:

- 1. There will be three sections.**
- 2. Section A carries 9 marks and is compulsory consisting of eight short answer type questions of 1.5 marks each covering the whole syllabus. The candidate will have to attempt any six questions in section A.**
- 3. Sections B and C will be set from units I & II respectively and will consist of four questions of 7 marks each from the respective unit. The candidates are required to attempt two questions from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

Course Objectives: The objectives of this course are to make the student familiar about the grounding, shielding and installation of switches, sockets, domestic fitting etc., also aims to measure various electrical parameters using different analog and digital instruments.

Course Contents:

UNIT-I

Select and perform measurements using analog / digital instruments and install or diagnose smart meters. Classification of electrical instruments and essential forces required in indicating instruments. PMMC and Moving iron instruments.

UNIT-II

Measurement of various electrical parameters using different analog and digital instruments. Measurement of energy in three phase circuit. Automatic meter reading infrastructures and Smart meter. Concept of Prosumer and distributed generation. Electrical supply requirements of smart meter, Detecting/clearing the tamper notifications of meter.

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Books Prescribed:

1. Electrical Engineering by B. L. Thareja
1. Electrical and Electronic measurements by A. K. Sawhney.
2. Ugly's Electrical References by George V. Hart, Publication: Jones & Bartlett Learning.
3. Electrician's Troubleshooting and Testing Pocket Guide by Brook Stauffer, John Traistor, Publication: McGraw-Hill.

Course Outcomes	On completing the course, the students will be able to:
CO1	Understand the different techniques to measure electrical parameters in electronic instruments.
CO2	Understand the concept of PMMC and Moving iron instruments.
CO3	Understand the basics of Automatic meter reading infrastructures and Smart meter.
CO4	Examine various real life situations in domestic or industrial scenario where measurements of electrical quantities are essential.
CO5	Choose the proper type and specification of measuring procedure and measuring instruments for different industrial/commercial/domestic applications.

SEMESTER-II
DEL-123
INSTALLATION AND MAINTENANCE
(THEORY)

Time: 3 Hours

Credits LTP:200
Maximum Marks: 50
(Theory Marks: 37+ Internal Assessment: 13)
Pass Marks: 35%

Note for paper setter and students:

- 1. There will be three sections.**
- 2. Section A carries 9 marks and is compulsory consisting of eight short answer type questions of 1.5 marks each covering the whole syllabus. The candidate will have to attempt any six questions in section A.**
- 3. Sections B and C will be set from units I & II respectively and will consist of four questions of 7 marks each from the respective unit. The candidates are required to attempt two questions from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

Course Objectives: The main objectives of this course are to make the students aware about the safe handling, error detection, testing and calibration of instruments. It also aims to plan and carry out installation, fault detection and repairing of domestic appliances.

Course Contents:

UNIT-I

Perform testing, verify errors and calibrate instruments. Errors and corrections in measurement. Loading effect of voltmeter and voltage drop effect of ammeter in circuits. Extension of range and calibration of measuring instruments. Plan and carry out installation, fault detection and repairing of domestic appliances. Working principles and circuits of common domestic equipment and appliances. Concept of Neutral and Earth. Execute testing, evaluate performance and maintenance of transformer.

UNIT-II

Working principle, construction and classification of transformer. Single phase and three phase transformers. Series and parallel operation of transformer. Voltage Regulation and efficiency. Auto Transformer and instrument transformers (CT & PT). Method of connecting three single phase transformers for three phase operation. Types of Cooling, protective devices, bushings and termination etc. Materials used for winding and winding wires in small transformer, motor coil winding & testing.

Books Prescribed:

1. Basic Electronics and Linear Circuits by N.N. Bhargava, D.C. Kulshreshtha and S.C. Gupta.
2. Foundations of Electronics by D. Chatopadhyay, P.C. Rakshit, B. Saha and N.N. Purkit.
3. Electrician’s Troubleshooting and Testing Pocket Guide by Brook Stauffer, John Traistor, Publication: McGraw-Hill.

Course Outcomes	On completing the course, the students will be able to:
CO1	Test, verify and calibration of electrical instruments.
CO2	Know loading effect of voltmeter and voltage drop effect of ammeter in circuits.
CO3	Understand the method of testing; evaluate performance and maintenance of transformer.
CO4	connect three single phase transformers for three phase operation.
CO5	Prepare materials used for winding and winding wires in small transformer.

SEMESTER-II

DEL-124

**PRACTICAL LAB III
(PRACTICAL)**

Time: 3 Hours

Credits:LTP:004

Maximum Marks: 100

(Practical Marks: 75+ Internal Assessment: 25)

Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows:

- i) One experiment: **30 Marks**
- ii) Brief Theory: **10 Marks**
- iii) Viva-Voce:**20 Marks**
- iv) Record (Practical file): **15 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session. Paper will consist of 6 experiments out of which an examinee will mark 4 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: The course objective is to make the student familiar with electrical instruments, power and energy. The student will also have the opportunity to learn how to dismantle and assemble electrical parts of various electrical appliances e.g. electric iron, electric kettle, cooking range, induction heater, oven, mixer grinder and geyser.

Course Contents:

1. Measure power, energy for lagging and leading power factors in single phase circuits and compare characteristic graphically.
2. Ascertain use of neutral by identifying wires of a 3-phase 4 wire system and find the phase sequence using phase sequence meter.
3. Prepare and practice on battery charging and details of charging circuit.
4. Determine the number of solar cells in series / parallel for given power requirement.
5. Prepare test boards / extension boards and mount accessories like lamp holders, various switches, sockets, fuses, relays, MCB, ELCB, MCCB etc.
6. Prepare pipe and plate earthing and measure earth resistance by earth tester / megger.

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7. Practice installation of various lamps e.g. fluorescent tube, HP mercury vapour, LP mercury vapour, HP sodium vapour, LP sodium vapour, metal halide etc.
8. Prepare decorative lamp circuit to produce rotating light effect/running light effect.
9. Practice on measuring instruments in single and three phase circuits e.g. multi-meter, Wattmeter, Energy meter, Phase sequence meter and Frequency meter etc.
10. Dismantle and assemble electrical parts of various electrical appliances e.g. electric iron, electric kettle, cooking range, induction heater, oven, mixer grinder and geyser.
11. Perform series and parallel operation of two single phase transformers.
12. Determine voltage regulation of single-phase transformer at different loads and power factors.

Books Prescribed:

1. Electrical Engineering by B. L. Thareja
2. Electrical and Electronic measurements by A. K. Sawhney.
3. Basic Electronics by D.C. Tayal (Himalaya Pub.)
4. Principles of Electronics by V.K. Mehta, Rohit Mehta (S. Chand Publications)
5. Practical Physics, C.L. Arora, S. Chand & Co

Course Outcomes	On completing the course, the students will be able to:
CO1	Find the power, energy for lagging and leading power factors in single phase circuits.
CO2	installation of various lamps e.g. fluorescent tube, HP mercury vapour, LP mercury vapour, HP sodium vapour, LP sodium vapour, metal halide etc.
CO3	Prepare test boards / extension boards and mount accessories like lamp holders, various switches, sockets, fuses, relays, MCB, ELCB, MCCB etc
CO4	Prepare and practice on battery charging and details of charging circuit.
CO5	Practice on measuring instruments in single and three phase circuits e.g. multi-meter, Wattmeter, Energy meter, Phase sequence meter and Frequency meter etc.

SEMESTER-II

DEL-125

**PRACTICAL LAB IV
(Training workshop)**

Time: 3 Hours

Credits:LTP:004

Maximum Marks: 100

(Practical Marks: 75 + Internal Assessment: 25)

Pass Marks: 35%

Course Objectives: Course objective of this subject is to follow the pragmatic way of learning and instill the basic experimental skills in the students. This will provide practical knowledge in field work with expert electrician in industrial training.

Course Contents:

Students can perform hand on practice with expert electricians while working in any workshop/training centre/ industry in collaboration with the college.

Course Outcomes	On completing the course, the students will be able to:
CO1	Perform work in real electrical circuit problems.
CO2	Prepare and install electrical wires in domestic and industry.
CO3	Assemble and disassemble various electrical instruments.
CO4	Measure electrical parameters in various electronic appliances.
CO5	Detect error and correction in different types of electrical instruments.

SEMESTER-II
DEL-126
Computer Lab-II
(PRACTICAL)

Time: 3 Hours

Credits:LTP:002
Maximum Marks: 50
(Practical Marks: 37+ Internal Assessment: 13)
Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows:

- i) One experiment: **15 Marks**
- ii) Brief Theory: **5 Marks**
- iii) Viva–Voce: **7 Marks**
- iv) Record (Practical file): **10 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session. Paper will consist of 6 experiments out of which an examinee will mark 4 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: This course has been formulated to enhance student’s ability/skill to understand the working of Microsoft word.

COURSE CONTENT:

Section-A

General Concept of Ms Excel: Overview, Creating, Opening, Editing, Formatting, Spell-Grammar Checking, document Handling, Printing and Saving.

Section-B

Commands used in excel sheet, addition and delete of row and coulum, merging of rows or columns, copy table to word file.

(PRACTICAL)

Working with Ms excel

BOOKS PRESCRIBED:

1. Computer Fundamentals:-P.K.Sinha
2. Introduction to Computers:- N. Subramanian
3. Introduction to Computers:- Peter Norton Mcgraw Hill

Course Outcomes:

Sr. No.	On completing the course, the students will be able to:
CO1	Understand the world of computer, and information & technology.
CO2	Understand the importance of hardwares and softwares of computers.
CO3	Understand the storage of data, memory devices.
CO4	Understand the applications of computer in our daily life, and in science & technology.
CO5	Understand the basics, working and use of ms excel.