Vocational Diploma in Mechanic (Electrical/Electronics/Instrumentation)

Regulation and Syllabus

TAMIL NADU OPEN UNIVERSITY

DEPT. OF PHYSICS

SCHOOL OF SCIENCE

577, Anna Salai, Saidapet, Chennai – 600 015

Tamil Nadu Open University

Department of Physics, School of Science

Vocational Diploma in Mechanic (Electrical/Electronics/Instrumentation) – Regulations

Objectives: The Vocational Diploma Programme in Mechanic (Electrical / Electronics / Instrumentation) has been designed keeping in mind youths unemployment problems in various levels. In this programme Electrical and Electronics parts, construction and functions are explained well and also the servicing guidelines. After completing the Vocational Diploma Programme in Mechanic (Electrical/Electronics/Instrumentation), the students have employment opportunities as Electrical service Centre, house electricition, Electronic service centre. This is a 44 credit programme comprising following courses:

1. Eligibility : 10^{th} Pass/ 10^{th} Fail with TNOU PPS/ TNOU PPE and PPS

2. Duration **:** One Year

3. Medium **:** English and Tamil Medium

4. Age **:** 15 Years

5. Scheme of Evaluation:

Course Code	Course Title	Credits	Marks Distribution		
			Assignment (Internal)	Term End Exam (External)	Total
VDHE -1	Fundamentals of Electricity, Electrical Machines and Measuring Instruments	6	25	75	100
VDHE - 2	Domestic Electrical Appliances	5	25	75	100
VDHE - 3	Electrical Equipment Installation, Maintenance and safety	5	25	75	100
LCS-1	Life Coping Skills	6	25	75	100
CNS-1	Communication Skills	6	25	75	100
VDHE- P1	Fundamentals of Electricity, Electrical Machines and Measuring Instruments	8	25	75	100
VDHE -P2	Electrical Equipment Installation, Maintenance and safety	8	25	75	100
Total		**44**	**175**	**525**	**700**

Examination System: Examination to the Vocational Diploma Programme in Mechanic (Electrical/Electronics/Instrumentation) is designed to maintain quality of standard. Theory Examinations and the Practical Examinations will be conducted by the University in the Community Colleges. For the Assignment students may be permitted to write with the help of books/materials for each Course, which will be evaluated by the Evaluators appointed by University.

Assignment: Assignment carries 25 marks, consists of Short Answer Questions (150 words) and Long Answer Questions (350 words) for each Course.

Section-A	Three Short-Answer Questions [Each 5- Marks]	3 X 5 = 15 Marks
Section-B	One Long Answer Question[10-Marks]	l X I0 = 10 Marks
Total		**25 Marks**

Theory Examination: Students shall normally be allowed to appear for theory examination by completing Practical and Assignment. The Term -End Examination shall Carry Section: A and Section: B.

Section-A	Five out of Eight Short-Answer Questions [Each 5- Marks]	5 X 5 = 25 Marks
Section-B	Five out of Eight Long-Answer Questions [Each 10- Marks] [Question 1 and 2 is compulsory. Question 1: 10 Multiple Choice questions with 3 choices Question 2: 10 State whether it is True or False]	5 X10 = 50 Marks
Total		**75 Marks**

Passing Minimum: The passing minimum is 45 percent in the external/theory examination and overall 50 per cent for successful completion of each course.

Passing Minimum (Practical): The passing minimum is 45 percent in the external/practical examination and overall 50 per cent for successful completion of each practical.

Classification of Successful Candidate: Candidates who pass all the Courses and who secure 60 per cent and above in the aggregate of marks will be placed in the first class. Those securing 50 per .cent and above but below 60 per cent in the aggregate will be placed in the second class.

Eligibility for Academic Counsellor: Person with qualification of B.E. (ECE/ EEE) or 3 Years DECE/ DEEE with minimum 2 years experience in automotive service sector.

Vocational Diploma in Mechanic
(Electrical/Electronics/Instrumentation)
Curriculum

VDHE –01: Fundamentals of Electricity, Electrical Machines and Measuring Instruments

Unit-01: Fundamentals of Electricity Electron theory & fundamental terms-Basic Electrical circuits- Ohm's Law- , Laws of resistance. Resistances in series and parallel. voltage and current division, Kirchhoff's Laws and applications. Simple electrical circuits and Concept three-phase Star and Delta connection. Brief Description of Resistive, Inductive & Capacitive loads. Magnetism- Principle of electro-magnetism, MMF, Flux density, reluctance. Alternating current circuits: Fundamentals and characteristics of AC circuits, Ac through R, L and C load. Power factor.

Unit-02: Semiconductor materials: 'P' type and 'N' type –P-N-junction. Basic concept of diode, transistor, MOSFET, SCR and IGBT. D.C. rectifier circuit: Half wave, Full wave and Bridge type rectifier circuit. Filter circuits. Inverter: Basics of Inverter, Types.. Basic concept of Integrated Circuits. Important ICs used in SMPS and UPS. Heat sink.

Unit-03: DC machines: General concept of Electrical Machines, Types of DC Machine, Constructional features of D.C machine- Principle of D.C. generator and motor. -. Brief description of series, shunt and compound generators. Application of D.C. generators and motors.

Unit-04: AC Machine: AC motors – Constructional details of single phase motors, types and applications. Construction of 3 phase induction motor, Starter for 3 phase induction motors. Alternator: Types, construction and operation. Transformer: construction, Working principle and types of Transformer, C.T., P.T. Instrument and Auto Transformer (Variac).

Unit-05: Electrical Measuring Instruments: classification, PMMC & MI meter (Ammeter, Voltmeter)- Range extension Study of Multimeter (Digital/Analog), Wattmeter, P.F. meter, - Energy meter (Digital/analog), Insulation Tester (Megger), Frequency meter, Phase Sequence meter, Tachometer. Study of Oscilloscope.

VDHE-02: Domestic Electrical Appliances, Installation, Maintenance and safety

Unit-01: Common Electrical wiring Accessories, their specifications, Different methods of measuring the values of resistance, circuit connection, Solders, flux, soldering and de-soldering technique, wire Crimping.

Unit – 02: Explanation of switches, lamp holders, plugs and sockets. Cables: Brief Description of Conductors, Strands, Cores and insulation of a Cable, Types and Selection of cables. Circuit Breakers: Brief description of Fuse, MCB's, MCCB's, Air, Vacuumed, Oil and SF6 Circuit Breakers, Selection of Circuit Breakers, Panel Boards: Types.

Unit-03: Lighting: Basics of illumination, Types of light (GLS,FTL, CFL, LED, MVL etc.) construction, working and applications, Light selection by manual method, IE rules.

Unit-04: Electric Fans: Types and selection of fans used at home: Ceiling fans, Table fan, Stand fan and Exhaust Fan. Construction and working of Heating appliances–Electrical Appliances: Mixers & Grinders, Wet Grinders washing machines, coolers – A/C, Geyser. Stabilizer.

Unit-05: Types of batteries: construction, methods of charging ,methods of connection and maintenance-Precautions to be taken. Ni-cadmium & Lithium cell, Different types of lead acid cells. Sealed Maintenance free Batteries, Solar battery. Application of battery/cell in Inverter, Battery Charger, UPS.

VDHE-03:Electrical Equipment Installation, Maintenance and safety

Unit-01: Domestic installation – Estimation: Domestic Installation – Practical- Principle of different methods of earthing. i.e. Pipe, Plate, etc Importance of Earthing. Improving of earth resistance, Earth Leakage circuit breaker (ELCB). Selection of Earthing according to the requirement of buildings.

Unit-02: Lightening Arrestors: Introduction to Lightening Arresters.

Unit-03: Basic principles of Electroplating and Electro chemical effects. Explanation of cells, Electrical appliances: Servicing – Servicing of Mixers & Grinders, Wet grinders, 1ph motors, Fans A/C, Geyser. Stabilizer, UPS, TV–Instructions for maintenance.

Unit-04: Electrical Hazards. Basic safety introduction, Personal protection. Basic injury prevention, Basic first aid, hazard identification and avoidance, Use of Fire extinguishers. Visit and observation of sections. Elementary first Aid. Concept of Standards

VDHE –P1: Fundamentals of Electricity, Electrical Machines and Measuring Instruments (Practical)

1. Verification of ohms law by using ammeter, voltmeter in dc circuit or low voltage.
2. Verification of the characteristics of DC series circuits
3. Verification of the characteristics of DC parallel circuits .
4. Verification of Kirchhoff's laws by using Meter Bridge or appropriate method or by using series and parallel circuits.
5. Verification of Resistance laws by using ohm meter.
6. Testing of accumulator/lead acid battery by hydrometer and tongue tester on charging and discharging .
7. Measurement of Power by voltmeter and ammeter.
8. Construction and verification of OR , AND , NOT gate
9. Construction and verification of Universal gates: NOR, NAND – XOR gate
10. Testing on Electrical and Electronic symbols.
11. Practice on fixing electrical accessories on switch boards/main boards .
12. Lamp circuits- connection of lamp and socket by separate switches in surface conduit wiring.
13. Simple lamp circuits- install stair case wiring in surface conduit wiring.
    Testing of wiring by ohmmeter/ megger
14. Verify Constructional features of D.C machine.
15. Verify working of series, shunt and compound DC generators and motors.
16. Verify Constructional details of single phase AC motors and its types.
17. Verify Construction of 3 phase induction motor and Starter for 3 phase induction motors.
18. Verify construction, Working principle and types of Transformer.

VDHE-P2: Electrical Equipment Installation, Maintenance and safety (Practical)

1. Procedure for testing of domestic appliances.
2. Detection of basic electrical faults such as improper / no earth, defective power cord, connector or internal wiring defect, short / loose / open contacts, blown fuse of Mixer/ Juicer/ Grinder
3. Diagnosing the reasons for appliance not running due to dysfunctional motor, overload circuit breaker tripping, no power supply – faulty fitting of dome lid cap, dome casket, jar overloading of Mixer/ Juicer/ Grinder
4. Verify the following function of components of Electrical system
    - Starter circuits
    - Ignition circuits
    - Charging circuits
    - Lighting circuits
    - Instrumentation
    - Spark ignition
    - Ancillary circuits and Battery
5. Verify the construction, working of Types. Lighting: Basics of illumination, Types of light (GLS, FTL, CFL, LED, MVL etc.)
6. Verify the Principle of different methods of earthing.
7. Verify the workingImportance of Earthing.
8. Verify the construction and working Earth Leakage circuit breaker(ELCB).
9. Verify the construction and working principle of Lightening Arresters.
10. Dismantling, re-assembling and troubleshooting of Electric Fan and Exhaust fan
11. Dismantling, re-assembling and troubleshooting of immersion water heater and hair dryer

CNS -01: Communication Skills

Unit-1: The Meaning and Process of Interpersonal Communication explains about the Definition of Communication-The Process and Elements of Communication –Types of Verbal Communication -Types of Communication- Interpersonal Communication – Communication as Skilled Behavior – Role of Social Skills in Interpersonal Communication – Features of a Good Conversation.

Unit-2: Effective Communication deals with Definition and Importance of Effective Communication - Components of Effective Communication – Guidelines, Principles and Strategies of Effective Communication.

Unit- 3: Situational Language presents about the Patterns of Phrases used in Daily Conversations Like: Greeting –Introducing -Requesting– Complimenting- Apologizing- Complaining Appreciating - Suggesting – Expressing Gratitude - Different Models of Situational Conversations Like: Restaurant –Banking – Shopping - Seeking and Giving Directions – Using Congratulatory Expressions and Its Responses.

Unit- 4: The Behavioural Communication deals with the Definition and Process of Behavioural Communication -Effective Criticism – Delivering Negative Feedback – Cautions to Remember before Delivering Negative Criticism.

Unit- 5: The Modes of Communication explains about the Definition of Group Discussion- Importance and Factors of Group Worthiness- Guidelines and Parameters for Successful Group Discussion- Definition Good Public Speaking- Three Important Elements- Pitfalls and Hindrances- Drafting a Good Speech.

Unit- 6: The Leadership and Team Communication present about the Definition and Types of Leadership- Ten Principles of Leadership Communication- Team Communication – Features of Team Members - Characteristics of Highly Cohesive Teams.

Unit- 7: The Interview Skills deals with Definition and Different Kinds of Interview – Preparation for Job – Telephonic Interview – Speaking to Foreigners.

Unit- 8: English as a Spoken and Written Language explains about the Simple Sentence – Word Order – Modals -Passive Voice – Paragraph and Essay Writing – Writing a Letter – Model Paragraph, Essay and Letter Writings.

LCS-01: Life-Coping Skills

Unit-1: Self Skills Part-(i) explains about the Self Concept, Core Characteristics, Self-Acceptance, Benefits and Personal Growth, Self Esteem, Advantages of Self-Esteem, Personality Development, Elements and Identity of the Individual.

Unit-2: Self Skills Part-(ii) presents Self Actualization, the Definition of Success, Obstacles and Hindrances, Overcoming Hindrances, Recipe for Success, Problem Solving, Decision Making Process and Principles of Managing Problems.

Unit-3: Social Skills deals with Definition of Social Skills, Relevance In Interpersonal Communication, Motivation, Bush and Pull Factors, Overcoming De-Motivating Factors, Definition of Time Management, Importance and Relevance of Time Management in Social Skills, Benefits and Managing Stress in Various Occasions.

Unit - 4: Leadership Skills explain about the concept of Emergence of a Leader, Characteristics of Leadership, Types of Leaders, Characteristics of a Successful Leader, Importance of Team Work and Benefits of Team Learning.

Unit -5: Coping Skills Part-(i) deals with Negative Emotions , Need for Coping with Negative Emotions ,Shyness and Loneliness and Various Types ,Symptoms and Causes ,Coping with Shyness and Illness , Depression and Fear and Various Types ,Symptoms and Causes , Coping with Depression and Fear ,Anger and Verbal Abuse ,Determinants of Anger , Managing Anger and Aggression , Failure and Criticism ,Positive Attitude Towards Failure and Coping with Failure and Negative Criticism.

Unit-6: Coping Skills Part-(ii) explains about the Definition of ill Behaviours, Need to cope with ill Behaviours-HIV (Human Immune Virus) and AIDS (Acquired Immune Deficiency Syndrome), Various Stages AIDS, Transmission of HIV, Diagnosis and Treatment for HIV and AIDS, Safe Sex, Alcoholism, Tobacco and Smoking, Process of De-Addiction and Rehabilitation.

Unit-7: Managerial Skills present about the Definition of Conflict and Change, Need or Coping with Conflict, Constructive and Destructive Aspects of Coping, Stages of Managing Conflicts and Conflict Management Strategies.

Unit-8: Entrepreneurial Skills explains about the Introduction to Counseling and Career Guidance, Objectives and Components of Career Guidance, Preparation for Job, Work Environment, Required Life Skills for Work Environment and Steps to Create Positive Work Ambience.