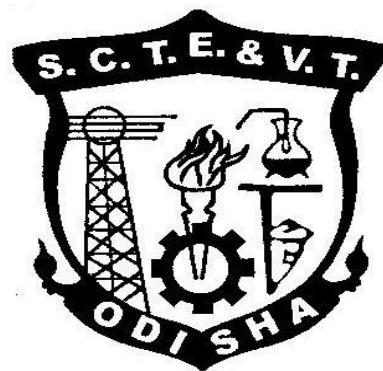


**CURRICULLUM OF
LEVEL 03; 2ND SEMESTER**

For

**DIPLOMA VOCATIONAL IN
AUTOMOBILE SERVICING**

(Effective FROM 2021-22 Sessions)



**STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING,
ODISHA, BHUBANESWAR**

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA								
TEACHING AND EVALUATION SCHEME FOR LEVEL 03: 2 nd Semester (D.Voc in Automobile Servicing) (wef 2021-22)								
Sl. No.	Subject Code	Subject	Periods/week		Credit		Marks in Evaluation Scheme	
			L	P	T	P	Exams (Hours)	Total Marks
		Theory						
1	Th.1	General Foundation Course –I	3	-	3	-	2	50
2	Th.2	Basic Electricity	3	-	3	-	2	50
3	Th.3	Basic Electronics	3	-	3	-	2	50
4	Th.4	Applied Mathematics-II	3	-	3	-	2	50
		<i>Total</i>	<i>12</i>		<i>12</i>			<i>200</i>
		Practical						
5	Pr.1	Basic Electricity Lab		1.5		1.5	3	50
6	Pr.2	Basic Electronics Lab		1.5		1.5	3	50
		<i>Total</i>		<i>03</i>		<i>03</i>		<i>100</i>
		On-Job-Training (OJT)						
7		One more QP to be opted from the QPs mentioned in the Level 3 1 st semester: Automotive Service Technician Level 3 (ASC/Q 1401) OR Auto Body Technician Level 3 (ASC/ Q 1410) OR Casting Technician Level 3 (ASC/Q 3202)		15		15	-	200
		<i>Total</i>		<i>15</i>		<i>15</i>		<i>200</i>
		Grand Total	12	18	12	18		500
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 60 minutes duration								
		Evaluating Agency / Body					Passing Marks	
Theory		State Council of Technical Education & Vocational Training, Odisha					35%	
Practical		SCTE&VT/ Institute / Skill Knowledge Provider (SKP) / Training Partner					50%	
On-job Training (OJT)		Concerned Industry (where On-job Training was undergone by the student)					50%	

TH.1. GENERAL FOUNDATION COURSE – I

Theory	3 Periods per week	Examination	2hours
Total Periods	45 Periods	Total Marks	50 Marks

Topic Wise Distribution of Periods

Sl. No.	Topic	Periods
1	Business Management and Entrepreneurship	15
2	Computational Skills	10
3	Environmental Education	10
4	Rural Development	10

DETAILED CONTENTS

1.0 Business Management and Entrepreneurship:

- Entrepreneurship Orientation
 - Importance and relevance in real life: Emphasis on self-employment.
- Entrepreneurship Values and Attitudes
 - Innovativeness, Independence, Risk Taking, Analytical ability.
- Entrepreneurial Motivation
 - Achievement Planning, personal efficacy, entrepreneurial goal setting.
- Launching of a Business Venture
 - Identification of project, steps in setting up a business, information about various institutions providing assistance, project formulation.

2.0 Computational Skills:

- Percentage, ratio & proportion, profit & loss, discount, simple and compound interest, population growth and depreciation of value of articles using logarithm.
- Area and volume: rectangle, parallelogram, circle, cube, cone, cylinder & sphere.

3.0 Environmental Education:

- Environment and the society, Environment properties risks in different economic enterprises, in use of raw materials, in processing / manufacturing and designing.
- Poverty and environment.

4.0 Rural Development:

- Agriculture, the back bone of Indian Economy.
- Rural development projects in India including Integrated rural development programme.
- Agro based rural industries, Community approach to rural development.

Syllabus to be covered before IA: Chapter 1,2,3

RECOMMENDED BOOKS

1. Environmental Studies, M.P. Poonia & S.C. Sharma, Khanna Publishing House
2. A Textbook of Environmental Sciences, Rimpi Mehani Ne' Chopra, Khanna Publishing House

TH.2. BASIC ELECTRICITY

Theory	3 Periods per week	Examination	2hours
Total Periods	45 Periods	Total Marks	50 Marks

Topic Wise Distribution of Periods

Sl No.	Topic	Periods
1	Current Electricity	5
2	D.C. Circuits	5
3	Electric Cells	7
4	Lighting Effects of Current	8
5	Capacitors	5
6	Electromagnetic Effects	8
7	A.C Circuits	7

DETAILED CONTENTS

1.0 Current Electricity:

- Definition of Resistance, Voltage, Current, Power
- Energy and their units, Relation between electrical, mechanical and thermal units
- Temperature variation of resistance
- Difference between AC and DC voltage and current

2.0 D.C. Circuits:

- Ohm's Law, Series – parallel resistance circuits, calculation of equivalent resistance
- Kirchhoff's Laws and their applications.

3.0 Electric Cells:

- Primary cell, wet cell, dry cell, battery, Li-ion battery, series and parallel connections of cells, Secondary cells, Lead Acid Cell
- Discharging and recharging of cells, preparation of electrolyte, care and maintenance of secondary cells.

4.0 Lighting Effects of Current:

- Lighting effect of electric current, filaments used in lamps, and Tube-light, LED, their working and applications.

5.0 Capacitors:

- Capacitor and its capacity, Concept of charging and Discharging of capacitors
- Types of Capacitors and their use in circuits, Series and parallel connection of capacitors
- Energy stored in a capacitor

6.0 Electromagnetic Effects:

- Permanent magnets and Electromagnets, their construction and use, Polarities of an electromagnet and rules for finding them.
- Faraday's Laws of Electromagnetic Induction, Dynamically induced e.m.f., its magnitude and induction, inductance and its unit. Mutually induced e.m.f., its magnitude and direction, Energy stored in an inductance.
- Force acting on a current carrying conductor in magnetic field, its magnitude and direction, Principles and construction of dynamo.

7.0 A.C Circuits:

- Generation of A.C. voltage, its generation and wave shape
- Cycle, frequency, peak value R.M.S. value, form factor, crest factor, Phase difference, power and power factor
- A.C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance, Q factor of R.L.C. series circuits.

Syllabus covered up to I.A-Chapters 1,2 &3

RECOMMENDED BOOKS

1. Basic Electrical Engineering, Ritu Sahdev, Khanna Publishing House
2. Basic Electrical Engineering, Pradeep Kumar, Khanna Publishing House

TH.3. BASIC ELECTRONICS

Theory	3 Periods per week	Examination	2hours
Total Periods	45 Periods	Total Marks	50 Marks

Topic Wise Distribution of Periods

Sl. No.	Topic	Periods
1	Overview of Atom, Sub-Atomic Particles and CRO	7
2	Voltage and Current	10
3	Basics of Semiconductor	10
4	Bipolar Junction Transistor	8
5	Transistor Amplifier and Applications	10

DETAILED CONTENTS

1.0 Overview of Atom, Sub-Atomic Particles and CRO:

- Brief History of Electronics, Atom and its elements
- Electron, Force, Field intensity, Potential, Energy, current
- Electric field, Magnetic field, Motion of charged particles in electric and magnetic field.
- Overview of CRO, Electronic and Magnetic deflection in CRO, Applications.

2.0 Voltage and Current:

- Resistance, Ohm's law, V-I Characteristics, Resistors, Capacitors, Inductors.
- Voltage and Current sources, Symbols and Graphical representation
- Overview of AC, DC, Cells and Batteries, Energy and Power.

3.0 Basics of Semiconductor:

- Semiconductor materials, Metals and Semiconductors and Photo-electric emission.
- N-type and P-type semiconductor, Effects of temperature on Conductivity of semiconductor.
- PN junction diode, depletion layer, Forward & Reverse bias, V-I Characteristic, Effects of temperature, Zener diode, Photo diode, LED, Types and applications of diode.
- Diode as a rectifier, Half wave and full wave rectification, Zener diode Regulator.
- Introduction to Filters, Clippers, Clampers

4.0 Bipolar Junction Transistor:

- Operation of NPN and PNP transistors, Biasing of BJT.
- CB, CE and CC configuration
- Introduction to FET, JFET, MOSFET, CMOS and VMOS

5.0 Transistor Amplifier and Applications:

- Introduction, Single and Multi-stage amplifiers
- Introduction to Oscillators
- Introduction to Thyristors, PNPN diode, SCR, LASCR, DIAC, TRIAC

Syllabus covered up to I.A-Chapters 1, 2 &3

RECOMMENDED BOOKS

1. Basic Electronics, S. Biswas, Khanna Publishing House
2. All in One Electronics Simplifies, A.K. Maini, Khanna Publishing House

TH.4. APPLIED MATHEMATICS – II

Theory	3 Periods per week	Examination	2hours
Total Periods	45 Periods	Total Marks	50 Marks

Topic Wise Distribution of Periods

Sl. No.	Topic	Periods
1	Algebra-II	10
2	Relations and Functions	8
3	Calculus	10
4	Vectors and Three Dimensional Geometry	10
5	Linear Programming and Mathematical Reasoning	7

DETAILED CONTENTS

1.0 Algebra-II:

- Matrices
- Determinants
- Inverse of a Matrix and its Applications

2.0 Relations and Functions:

- Relations and Functions-II
- Inverse Trigonometric Functions

3.0 Calculus:

- Limits and Continuity
- Differentiation, Differentiation of Trigonometric functions, Differentiation of Exponential and Logarithmic functions, Application of Derivatives
- Integration
- Definite Integrals
- Differential Equations

4.0 Vectors and Three Dimensional Geometry:

- Introduction to Three Dimensional Geometry, Vectors, Plane, Straight Line

5.0 Linear Programming and Mathematical Reasoning:

- Types Linear Programming
- Mathematical Reasoning

Syllabus covered up to I.A-Chapters 1, 2 &3

RECOMMENDED BOOKS

1. Applied Mathematics-II, J.K. Tyagi, Khanna Publishing House
2. Elements of Mathematical Analysis, R. Agor, Khanna Publishing House

Pr.1 BASIC ELECTRICITY LAB

Practical	1.5 Periods per week	Examination	3 hours
Total Periods	23 Periods	Total Marks	50 Marks

List of Practical Experiments:

1. Verify that resistance of conductor is directly proportional to resistivity and length and inversely proportional to cross- sectional area of the conductor.
2. Verification of Ohm's Law.
3. Verification of temperature co-efficient of resistance:
 - (i) Positive for Tungsten and Nichrome and
 - (ii) Negative for carbon.
4. Study of series resistive circuits.
5. Study of parallel resistive circuits.
6. Study of series and parallel connection of cells in circuits.
7. Preparation of Electrolyte for lead acid battery and its charging and measurement of Specific gravity with the help of hydrometer.
8. To find heat efficiency of an electric kettle.
9. Charging and Discharging of a capacitor.
10. Verification of magnetic field of a Solenoid with:
 - (i) Iron core and
 - (ii) Air core.
11. Verification of Faraday's Laws of electromagnetic induction.
12. Verification of Torque development in a current carrying coil in magnetic field.
13. Study of R.L. series circuit and measurement of power and power factor.
14. Study of R.C. series circuit and measurement of power and power factor.
15. Study of R.L.C. series circuit and measurement of power and power factor.
16. Study of R.L.C. series circuit for calculation of inductive reactance, capacitive reactance, impedance and Q- Factor.

Pr 2. BASIC ELECTRONICS LAB

Practical	1.5 Periods per week	Examination	3 hours
Total Periods	23 Periods	Total Marks	50 Marks

List of Practicals

1. Study of current and voltage measurement using Ammeter and Voltmeter.
2. Study of current and voltage measurement using Galvanometer.
3. Study of current, voltage and resistance measurement using of Multi-meter
4. Study of Power and Energy measurement using Wattmeter and Energy meter.
5. Study of working principle of Signal Generator and measurement of amplitude, time period and frequency of signal using Oscilloscope.
6. Study of V-I Characteristic of Diode.
7. Study of V-I Characteristic of Zener Diode. And use of Zener Diode as voltage regulator.
8. Study of Half wave rectifier with and without filter circuit.
9. Study of Full wave rectifier with and without filter circuit.
10. Study CE configuration for NPN and PNP transistors and measurement of voltage and current gain.
11. Study CB configuration for NPN and PNP transistors and measurement of voltage and current gain.
12. Study CC configuration for NPN and PNP transistors and measurement of voltage and current gain.
13. Study of working of single layer PCB manufacturing
14. Study of working of double layer PCB manufacturing.
15. Design of 7 segment display using LED and bread board.

EQUIPMENT LIST

BASIC ELECTRICITY LAB

Sl. No.	Name of the Equipment
01	Trainer kit for verifying ohm's law
02	Trainer kit for measuring TCR
03	Lead acid battery
04	Hydrometer
05	Electric kettle
06	Trainer kit for measuring power and power factor in RLC circuits

BASIC ELECTRONICS LAB

Sl. No.	Name of the Equipment
01	Ammeter
02	Voltmeter
03	Multi-meter
04	Galvanometer
05	Energy Meter
06	CRO
07	Diode Trainer kit
08	Zener diode Trainer kit
09	Rectifier trainer kit
10	Transistor characteristics trainer kit
11	PCB manufacturing Lab
12	Bread board trainer kit to design 7 segment displays