WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION

SYLLABUS FOR CLASSES XI AND XII

SECTOR: POWER

JOB ROLE: LINEMAN DISTRIBUTION

COURSE OVERVIEW:

COURSE TITLE: POWER - LINEMAN DISTRIBUTION

An incumbent in this job will replace and maintain steel, wood, laminate and concrete poles, structures and other related hardware. They install, maintain and repair overhead and underground power lines and cables, and other associated equipment such as insulators, conductors, lightning arrestors, switches, metering systems, transformers and lighting systems. They attend to customer breakdown complaints and requests, releasing and restoring connections. They also attend to street lighting maintenance.

COURSE OUTCOMES:

On completion of the course, student should be able to:

- Apply effective oral and written communication skills to interact with people and customers;
- Identify the principal components of a computer system;
- Demonstrate the basic skills of using computer;
- Demonstrate self-management skills;
- Demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities;
- Demonstrate the ability of laying the electricity distribution line.
- Change, remove and Install line.
- Identification and fault rectification in distribution line.
- Cable connection of distribution line.
- Skills of Electrical Safety
- Identifying the important joints locations in field
- Reading of CAD drawing of distribution line

COURSE STRUCTURE:

JOB ROLE: LINEMAN DISTRIBUTION **SECTOR: POWER**									
Class	**Semester**	**Contact Hours**					**Marks**		
		Employability Skills	**Domain (Theory & Practical)**	**Practical Exam/Written Test/ Viva**	**Project (Practical File/Student Portfolio/ Viva Voce)**	**Total**	**Theory**		**Practical**
XI	I	70	75	-	-	145	30	Average of Sem I & Sem II = 30	NIL
	II	40	90	10	15	155	30		50 + 20 = 70
XII	III	70	80	-	-	150	30	Average of Sem III & Sem IV = 30	NIL
	IV	40	85	10	15	150	30		50 + 20 = 70

Class XI [Total Theory Marks: 30]
Class XI SEMESTER 1 TOPICS: (MCQ) MARKS: 30 [1 MARK PER QUESTION]

SL No.	Topic	Tuition Hours	Marks Allotted
	Part A: Employability Skills	**70**	
1	Unit 1: Communication Skill	25	**02**
2	Unit 2: Self-management Skill	25	**02**
3	Unit 3: ICT Skill	20	**02**
	Part B: Vocational Skills	**75**	
4	Unit I: Basic Electricity-I	50	**16**
5	Unit II: Handling tools and equipment's	25	**08**
Total		**145**	**30**

Class XI SEMESTER 2 TOPICS: [Short Answer Question, Descriptive Question] MARKS: 30

SL No.	Topic & Sub-Topics	Tuition Hours	Short Answer Type Question (10 Marks)	Descriptive Type Question (20 Marks)	Total
	Part A: Employability Skills	**40**			
1	Entrepreneurial Skill	25	**1**	**2**	3
2	Green Skill	15	**1**	**2**	3
	Part B: Vocational Skills	**90**			
3	Unit 3: Electrical wiring components and accessories	40	**3**	**7**	**10**
4	Unit 4: Repair and maintenance of Power Distribution lines	50	**5**	**9**	**14**
	Part C: Practical Work	**10**			
5	Practical Examination	06			
6	Written Test	01			
7	Viva Voce	03			
	Part D: Project Work/ Field Visit	**15**			
8	Practical File / Student Portfolio	10			
9	Viva Voce	05			
Total		**155**	**10**	**20**	**30**

JOB ROLE: LINEMAN DISTRIBUTION

Class XII [Total Theory Marks: 30]

Class XII SEMESTER 3 TOPICS: (MCQ) MARKS: 30 [1 MARK PER QUESTION]

SL No.	Topic	Tuition Hours	Marks Allotted
	Part A: Employability Skills	**70**	
1	Unit 1: Communication Skill	25	**2**
2	Unit 2: Self-management Skill	25	**2**
3	Unit 3: ICT Skill	20	**2**
	Part B: Vocational Skills	**80**	
4	Unit 1: Basic Electricity-II	30	**8**
5	Unit 2: Observe the Operation and Maintenance of 11/0.433 kV Distribution substation	50	**16**
Total		**150**	**30**

Class XII SEMESTER 4 TOPICS: [Short Answer Question, Descriptive Question] MARKS:30

SL No.	Topic & Sub-Topics	Tuition Hours	Short Answer Type Question (10 Marks)	Descriptive Type Question (20 Marks)	Total
	Part A: Employability Skills	**40**			
1	Unit 4: Entrepreneurial Skill	25	**1**	**2**	**3**
2	Unit 5: Green Skill	15	**1**	**2**	**3**
	Part B: Vocational Skills	**85**			
3	Unit 3: Safety Precautions for electrical work	25	**2**	**5**	**7**
4	Unit 4: Workplace Management, Safety and Health	60	**6**	**11**	**17**
	Part C: Practical Work	**10**			
5	Practical Examination	06			
6	Written Test	01			
7	Viva Voce	03			
	Part D: Project Work/ Field Visit	**15**			
8	Practical File / Student Portfolio	10			
9	Viva Voce	05			
Total		**150**	**10**	**20**	**30**

DETAIL SYLLABUS
CLASS - XI
SEMESTER – I

Part A: Employability Skills			
Unit 1: Communication Skill – III			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 Hrs)**
1. Demonstrate knowledge of various methods of communication	1. Methods of communication 2. Verbal 3. Non-verbal 4. Visual	1. Writing pros and cons of written, verbal and non- verbal communication 2. Listing do's and don'ts for avoiding common body language mistakes	05
2. Identify specific communication styles	1. Communication styles- assertive, aggressive, passive-aggressive, submissive, etc.	1. Observing and sharing communication styles of friends, teachers and family members and adapting the best practices 2. Role plays on communication styles.	10
3. Demonstrate basic writing skills	1. Writing skills to the following: • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph	1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject	10
Unit 2: Self-management Skills – III			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 Hrs)**
1. Demonstrate impressive appearance and grooming	1. Describe the importance of dressing appropriately, looking decent and positive body language 2. Describe the term grooming 3. Prepare a personal grooming checklist 4. Describe the techniques of self- exploration	1. Demonstration of impressive appearance and groomed personality 2. Demonstration of the ability to self- explore	10
2. Demonstrate team work skills	1. Describe the important factors that influence in team building 2. Describe factors influencing team work	1. Group discussion on qualities of a good team 2. Group discussion on strategies that are adopted for team building and team work	10

3. Apply time management strategies and techniques	1. Meaning and importance of time management – setting and prioritizing goals, creating a schedule, making lists of tasks, balancing work and leisure, using different optimization tools to break large tasks into smaller tasks.	1. Game on time management 2. Checklist preparation 3. To-do-list preparation	05
Unit 3: Information and Communication Technology Skills - III			
Learning Outcome	**Theory (08 hrs)**	**Practical (12 hrs)**	**Duration (20Hrs)**
1. Create a document on word processor	1. Introduction to word processing. 2. Software packages for word processing. 3. Opening and exiting the word processor. 4. Creating a document	1. Demonstration and practice of the following: • Listing the features of word processing • Listing the software packages for word processing • Opening and exit the word processor • Creating a document	10
2. Edit, save and print a document in word processor	1. Editing text 2. Wrapping and aligning the text 3. Font size, type and face. 4. Header and Footer 5. Auto correct 6. Numbering and bullet 7. Creating table 8. Find and replace 9. Page numbering. 10. Printing document. 11. Saving a document in various formats.	1. Demonstration and practising the following: • Editing the text • Word wrapping and alignment • Changing font type, size and face • Inserting header and footer • Removing header and footer 2. Using autocorrect option 3. Insert page numbers and bullet 4. Save and print a document	10

Part B: Vocational Skills			
Unit 1: Basic Electricity-I			
Learning Outcome	**Theory**	**Practical**	**Duration (50 Hrs)**
1. Illustrate basic electricity generation concept	1. Origin of electricity 2. Importance of electricity 3. Generation of electricity	1. List the sources of electricity 2. Draw a sketch to show how electricity is generated	10
2. Describe basic units and definition of electricity	1. Electricity – concept and definition 2. Definition of voltage, current, resistance, capacitance and inductance 3. Understanding series and parallel connection. 4. Describe the ohm's law 5. Understand KVL and KCL	1. Identification of various electrical symbols. 2. Demonstration of ohm's law and do practice 3. Voltage and current measurement using multimeter 4. Identify conductors, resistors & insulators 5. Make a simple circuit with	15

	by evaluating basic circuits containing resistor	passive components and verify using multimeter	
3. Explain the concept of electrical power and energy	1. Difference between power and energy 2. Power and energy calculation in DC and AC systems 3. Concept of power factor 4. Single and three phase system 5. Transmission of electricity at different voltage levels.	1. Measure voltage and current using multimeter 2. Calculate the instantaneous power consumption 3. Calculate the real and reactive power from the power factor 4. Check the residential meter for instantaneous load	15
4. Explain the importance of earthing system	1. Earthing importance and types 2. Lightning arrester 3. Tools used for checking earth resistance	1. Demonstrate the use of earth resistance meter 2. Measure the earth resistance	10
Unit 2: Handling tools and equipment's			
Learning Outcome	**Theory**	**Practical**	**Duration (25 Hrs)**
1. Demonstrate electrical Hand Tools safely	1. Electrical hand tools – Pliers, screw drivers, connectors, hammers, tester, electrician knife, wire-stripper etc. their specifications-size and numbers 2. Various electrical hand tools 3. Safety precautions while using tools 4. Working of various hand tools and their use 5. State Specifications of tools	1. Draw the sketches of electrical hand tools. 2. List out the various electrical hand tools 3. Demonstrate safety precautions while using tools 4. Select the appropriate hand tools for work 5. Perform the various operation using hand-tools safely 6. Visit to the market and note the brand of various electrical hand tools	10
2. Measure electrical and electronic parameters accurately with precautions	1. Electronic Meter 2. Ammeter and Voltmeter: 3. Details of ammeter & voltmeter parts, working and operation 4. Practice safety precautions for different types of meters while using in circuits.	1. List out various part of electronic meter 2. Identify and explain various parts of electronic meter 3. Demonstrate the connection to electronic meter, ammeter and voltmeter 4. Demonstrate the types and specification of different type of meter 5. Draw the wiring diagram of joints	15

DETAIL SYLLABUS
CLASS - XI
SEMESTER – II

Part A: Employability Skills			
Unit 4: Entrepreneurial Skills – III			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 Hrs)**
1. Describe the significance of entrepreneurial values and attitude	1. Values in general and entrepreneurial values 2. Entrepreneurial value orientation with respect to innovativeness, independence, outstanding performance and respect for work	1. Listing of entrepreneurial values by the students. 2. Group work on identification of entrepreneurial values and their roles after listing or reading 2-3 stories of successful entrepreneur 3. Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home assignments	10
2. Demonstrate the knowledge of attitudinal changes required to become an entrepreneur	1. Attitudes in general and entrepreneurial attitudes 2. Using imagination/ intuition 3. Tendency to take moderate risk 4. Enjoying freedom of expression and action 5. Looking for economic opportunities 6. Believing that we can change the environment 7. Analyzing situation and planning action 8. Involving in activity	1. Preparing a list of factors that influence attitude in general and entrepreneurial attitude 2. Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like thematic appreciation test 3. Preparing a short write-up on “who am I” 4. Take up a product and suggest how its features can be improved 5. Group activity for suggesting brand names, names of enterprises, etc.	15
Unit 5: Green Skills – III			
Learning Outcome	**Theory (07 hrs)**	**Practical (08 hrs)**	**Duration (15 Hrs)**
1. Describe importance of main sector of green economy	1. Main sectors of green economy- E-waste management, green transportation, renewal energy, green construction, water management 2. Policy initiatives for greening economy in India	1. Preparing a poster on any one of the sectors of green economy 2. Writing a two-page essay on important initiatives taken in India for promoting green economy	08

2. Describe the major green Sectors/Areas and the role of various stakeholder in green economy	1. Stakeholders in green economy 2. Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries	1. Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries	07

Part B: Vocational Skills			
Unit 3: Electrical wiring components and accessories			
Learning Outcome	**Theory**	**Practical**	**Duration (40 Hrs)**
1. Identify and select the wiring materials and components	1. Wiring material 2. Application of wiring material 3. Electrical wiring accessories and their specifications 4. Material for PVC casing capping wiring 5. Material for PVC & MS conduit pipe wiring: Material for concealed wiring 6. CDP, ICTP, starters, distribution board	1. Identify various wiring materials and different types of wires and their specification 2. List various wiring materials 3. Identify various wiring materials 4. Connect the accessories with the wires 5. Connect the different types of components with wires in a junction box	10
2. Draw Wiring Circuits & fix wiring accessories on board.	1. Fix wiring accessories on board by screws 2. Series and parallel connections of lamp	1. Fixing wiring accessories on board 2. Circuit diagram of simple wiring 3. Draw circuit diagram of wiring 4. Check the connection of one lamp by one switch 5. Check the connection of lamps by one switch (series) 6. Check the connection of lamps by two switch (parallel) 7. Demonstrate and identify different types of wires and cables	15
3. Describe the various types of cable joints	1. Need and importance of underground cable jointing procedure 2. Types of joints and their uses 3. Types of wires and cables 4. Specification of wires and cables, 5. Precautions while using various types of cables	1. List out material and tools required for underground cable jointing 2. Demonstrate the skinning of the plastic covering of the cable 3. Prepare underground cable jointing, with crimping lug jointing etc. 4. Prepare a straight joint of 7/20 PVC wire 5. Prepare a “T” joint of 7/20 PVC wire	15

		6. Prepare a Britannia joint of Bare copper conductor (overhead line)	
Unit 4: Repair and maintenance of Power Distribution lines			
Learning Outcome	**Theory**	**Practical**	**Duration (50 Hrs)**
1. Prepare for repair and maintenance of power distribution lines	1. Components of Distribution line 2. Tools to be used for repair and maintenance 3. Distribution line standards 4. Identify various types of circuits 5. Distribution line assessment and inspection for maintenance and operations 6. Specific terminology used in Distribution Line work Terminology 7. Different types of material and accessories used in power Distribution 8. Permission for work permit	1. Perform load checks to identify imbalanced and overloaded circuits 2. Trimming trees near poles 3. Conduct site inspection for emergency cases 4. Identify tools, equipment and instruments required 5. Handling of tools 6. Planning of repair procedure 7. Switching of the transformer 8. Visit to the repairing site and fault observation 9. List the procedure to obtain the work permit	10
2. Operation/repair of Distribution line components	1. Troubleshooting and repair methods 2. Fault indication 3. Overhead distribution system apparatus 4. Overhead distribution system standards 5. Access points in distribution system 6. Ground distribution system apparatus 7. Causes of conductor damage 8. Aeolian vibration, sway oscillation, galloping, unbalanced loading 9. Over loading 10. Classification of conductor and insulator damage including fretting, abrasion, fatigue breaks, tensile breaks	1. Identify which distribution line need repair 2. Identify the reasons for the fault 3. Find the section where fault has occurred 4. Observe the wire assembly 5. Observe the distribution line repairing process 6. Check if lines are properly aligned by tightening appropriate nuts and bolts 7. Ensure proper clearance of lowest conductor from ground 8. Ensure the insulators are of suitable capacity 9. Select and use test equipment such as tongtesters/clip-on meter, meggers and voltmeters to verify fault and integrity 10. Isolate fault, damage or hazard 11. Repair conductor by splicing, jointing, using armor rods, line guards, vibration dampers 12. Restore the power to the customer	20

3. Maintenance of Distribution lines and components	1. Identify defects and take appropriate actions 2. Follow the laid down procedures observing safety 3. Follow maintenance schedule (annual, regular and preventive)	1. Observe the restoration of the system to normal operating status by using switching procedures 2. Leave the work area in a safe and tidy condition 3. On completion of the repair and maintenance activities check for the unwanted things left on the site 4. Report the unsolved problems to the relevant authority 5. Monitor the problem and keep the supervisor informed about progress or any delays	10
4. Operate different tools	1. Operation of different tools 2. Conductors 3. Insulators	1. Use safety helmet, safety glove, safety shoe, climbing harness, lanyard and tool belt (when climbing), earth rod (discharge rod), Zola, safety rope 2. Observe or demonstrate the operation of different tools like gas cylinder, blower, clamping tools, cable jointing kit etc 3. Identify and observe the different types of conductors base on sizes, current carrying capacity, 4. Identify and observe the different types of Insulators such as Pin, Disc, shackle, Guy etc.	10

DETAIL SYLLABUS
CLASS - XII
SEMESTER – III

Part A: Employability Skills			
Unit 1: Communication Skills – IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 Hrs)**
1. Describe the steps to active listening skills	1. Importance of active listening at workplace 2. Steps to active listening	1. Demonstration of the key aspects of becoming active listener 2. Preparing posters of steps for active listening	10
2. Demonstrate basic writing skills	2. Writing skills to the following: • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph	1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject	15
Unit 2: Self-management Skills – IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Total Duration (25 hrs)**
1. Describe the various factors influencing self-motivation	1. Finding and listing motives (needs and desires); 2. Finding sources of motivation and inspiration (music, books, activities); expansive thoughts; living fully in the present moment; dreaming big	1. Group discussion on identifying needs and desire 2. Discussion on sources of motivation and inspiration	10
2. Describe the basic personality traits, types and disorders	1. Describe the meaning of personality 2. Describe how personality influence others 3. Describe basic personality traits 4. Describe common personality disorders-paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive	1. Demonstrate the knowledge of different personality types	15
Unit 3: Information and Communication Technology Skills - IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 Hrs)**
1. Perform tabulation using spreadsheet	1. Introduction to spreadsheet application	1. Demonstration and practice on the following:	10

application	2. Spreadsheet applications 3. Creating a new worksheet 4. Opening workbook and entering text 5. Resizing fonts and styles 6. Copying and moving 7. Filter and sorting 8. Formulas and functions 9. Password protection. 10. Printing a spreadsheet. 11. Saving a spreadsheet in various formats.	• Introduction to the spreadsheet application • Listing the spreadsheet applications • Creating a new worksheet • Opening the workbook and enter text • Resizing fonts and styles • Copying and move the cell data • Sorting and Filter the data • Applying elementary formulas and functions • Protecting the spreadsheet with password • Printing a spreadsheet • Saving the spreadsheet in various formats.	
2. Prepare presentation using presentation application	1. Introduction to presentation 2. Software packages for presentation 3. Creating a new presentation 4. Adding a slide 5. Deleting a slide 6. Entering and editing text 7. Formatting text 8. Inserting clipart and images 9. Slide layout 10. Saving a presentation 11. Printing a presentation document.	1. Demonstration and practice on the following: • Listing the software packages for presentation • Explaining the features of presentation • Creating a new presentation • Adding a slide to presentation. • Deleting a slide • Entering and edit text • Formatting text • Inserting clipart and images • Sliding layout • Saving a presentation • Printing a presentation document	15

Part B: Vocational Skills			
Unit 1: Basic Electricity-II			
Learning Outcome	**Theory**	**Practical**	**Duration (Hrs)**
1. Describe basic electrical quantity	1. SI units Basic electrical quantity – current, voltage, resistance, load, energy power, work 2. Constant current source 3. Constant voltage source 4. Measuring instruments for electrical quantities 5. Importance and use of various electrical quantity	1. Make list of the basic electrical quantity 2. List out and name the basic units of electrical quantity Identify and draw the symbols for each electrical quantity 3. Define the various electrical quantity 4. List out and name the measuring instruments required to measure the various electrical quantity	10
2. Identify electronic	1. Electronic components	1. Identification of electronic	10

components	Types of components – active and passive components 2. Active components – current source, voltage source 3. Passive components – register, capacitor, inductor 4. List and name the various active and passive components 5. Types and features of passive components I 6. Importance and use of electronic components Color codes for passive components	components 2. Prepare a list the types of components 3. Identify the various types of register, capacitor and inductor 4. Identify electronic components in circuit 5. Identify the passive components by visual inspection 6. Identify and interpret the coded marking of colors on the registers	
3. Draw and design basic circuits	1. Drawing of simple series & parallel circuits and symbols 2. Circuit types – series connection, parallel connection, series- parallel connection 3. Calculations of value of resistors in resistive circuits	1. List the types of electrical circuits 2. Draw simple series & parallel circuits R 3. Reading of circuit diagram and prepare report 4. Calculate the value of passive components in series and parallel circuits.	10
Unit 2: Observe the Operation and Maintenance of 11/0.433 kV Distribution substation			
Learning Outcome	**Theory**	**Practical**	**Duration (Hrs)**
1. Operation of 11/0.433 kV Distribution system	1. Government policies and regulations 2. Various components of the 11 kV power system 3. Components: e.g. transformers, Isolators, CTs, PTs, Circuit breakers, Las, etc. 4. Various types of Panels & Sub-station protection systems 5. Transformers part and their function 6. Specific health and safety precautions which must be taken when carrying out substation installation processes 7. Hazards associated with carrying out substation construction and installation	1. List the job requirements as per the government policies and regulations 2. Observe the various components of the power system by visiting the 11 kV substation 3. List the materials required for the 11 kV installation 4. Observe the substation erection and installation work 5. Observe the operation of distribution transformer 6. Check the poles set to proper depth, and are properly aligned 7. Observe the erection of channel on the pole 8. Observe the fixing of lightning arrester 9. Check the installation of earth connection as per standard procedure 10. Observe the lifting of the transformer, to put it on the transformer bed in a safe and efficient manner	25

		11. Observe the connection of low voltage cables	
2. Maintenance of 11/0.433 kV Distribution system	1. Hazards: e.g. live wires and equipment, heavy objects, insects and reptiles, 2. Obstructions and blockages, sharp edges and equipment, etc. 3. Maintenance procedures 4. Importance of leaving the work area and equipment in a safe and clean 5. Importance of reporting problems in a timely manner 6. Calibration schedule of all equipment used in the construction and	1. Check Oil level and ensure leakages 2. Check Oil BDV and acidity at regular intervals as per schedule and standard procedure 3. Checking for sludge, dust, dirt, moisture ion in oil 4. Observe the cleaning bushings regularly and inspect for any cracks 5. Check, note and rectify dust & dirt deposition, salt or chemical deposition, 6. Check neutral grounding and ensure it is maintained as per standard 7. Periodically check for any loose connections of the terminations of HV & LV side	25

DETAIL SYLLABUS
CLASS - XII
SEMESTER – IV

Part A: Employability Skills			
Unit 4: Entrepreneurial Skills – IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 Hrs)**
1. Identify the general and entrepreneurial behavioural competencies	1. Barriers to becoming entrepreneur 2. Behavioural and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity	1. Administering self- rating questionnaire and score responses on each of the competencies 2. Collect small story/ anecdote of prominent successful entrepreneurs 3. Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioural competencies 4. Preparation of competencies profile of students	10
2. Demonstrate the knowledge of self-assessment of behavioural competencies	1. Entrepreneurial competencies in particular: self - confidence, initiative, seeing and acting on opportunities, concern for quality, goal setting and risk taking, problem solving and creativity, systematic planning and efficiency, information seeking, persistence, influencing and negotiating, team building	1. Games and exercises on changing entrepreneurial behaviour and development of competencies for enhancing self-confidence, problem solving, goal setting, information seeking, team building and creativity	15
Unit 5: Green Skills – IV			
Learning Outcome	**Theory (05 hrs)**	**Practical (10 hrs)**	**Duration (15 Hrs)**
1. Identify the role and importance of green jobs in different sectors	1. Role of green jobs in toxin- free homes, 2. Green organic gardening, public transport and energy conservation, 3. Green jobs in water conservation 4. Green jobs in solar and wind power, waste reduction, reuse and recycling of wastes, 5. Green jobs in green tourism 6. Green jobs in building and construction 7. Green jobs in appropriate	1. Listing of green jobs and preparation of posters on green job profiles 2. Prepare posters on green jobs.	15

	technology 8. Role of green jobs in Improving energy and raw materials use 9. Role of green jobs in limiting greenhouse gas emissions 10. Role of green jobs minimizing waste and pollution 11. Role of green jobs in protecting and restoring ecosystems 12. Role of green jobs in support adaptation to the effects of climate change		

Part B: Vocational Skills			
Unit 3: Safety Precautions for electrical work			
Learning Outcome	**Theory**	**Practical**	**Duration (Hrs)**
1. Implement safety measures in workshop	1. Shop discipline 2. Safety precautions Electric 3. Explain safety precautions to be observed in electrical jobs or workshops 4. Shock – causes of electric shock, 5. Artificial respiration	1. Visit a electrical workshop and observe the safety procedures followed 2. Prepare a list of emergency contact numbers 3. Demonstrate the procedure for separating a person from contact with live wire 4. Demonstrate CPR on a person 5. Demonstrate the use of First-aid	10
2. Demonstration of fire protection	1. Importance of fire extinguishers 2. Parts of fire extinguishers 3. Causes of fire, types of fire	1. Identify the types and causes of fire 2. Identify the location of fire extinguishers fitted in schools 3. Draw the sketch of fire extinguishers uses 4. Operate various fire extinguishers 5. Watch a video on YouTube demonstrating the use of fire extinguishers	15
Unit 4: Workplace Management, Safety and Health			
Learning Outcome	**Theory**	**Practical**	**Duration (hrs)**
1. Describe the importance and need of workplace health & safety	1. How to maintain the work area safe and secure 2. Understanding safety policy 3. Types of fire extinguishers and techniques of using fire extinguishers 4. Handling procedure of	1. Remove rings or any other metal objects before working on the unit 2. Demonstrate the use of fire extinguishers A, B, C and ABC 3. Demonstrate the use of first aid for electrical shock & burn victims	20

	hazardous chemicals 5. Reporting of incidents 6. Knowledge of ESD and handling of electronic components 7. Emergency procedures to be followed in the event of fire, accidents, etc. 8. Assess the involved risks at workplace 9. Identify health issues at workplace 10. Identify the preventive measures to be taken 11. Understand the safety guidelines. 12. Advantages of safety guideline and follow them. 13. Procedure of applying the guidelines of safety	4. Demonstration of fire drills & evacuation procedures 5. Identify any hazardous materials or things found in the premises and report 6. Follow applicable local electrical codes and standards 7. Use methods to avoid the hazards associated with an assembly process 8. Identification of materials used for safety. 9. Demonstrate the use of protective equipment 10. Report the history of the hazards associated with the workplace	
2. Describe the importance of personal safety	1. Need of personnel safety 2. Safety during the construction and installation of earthing and trenching 3. Personal protection equipment (PPE) like anti-static bands	1. Demonstrate the safety procedure for construction and installation of earthing and trenching 2. Use the personal protection equipment like anti- static bands	10
3. Maintaining good health and posture	1. Understanding health policy, posture, exercise & diet 2. How to handle hazardous materials, tools and equipment 3. Long term value of good posture and use of appropriate handling equipment	1. Practice of sitting or standing posture for long period of time 2. Position and in handling heavy materials 3. Practice Yoga 4. Handle heavy materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders	10
4. Manage workplace asset	1. Creating tool list & storage of tools 2. Procedure of calibrating measuring instruments 3. Managing tool crib library	1. Identify tools 2. Calibrate measuring instruments 3. Cleaning of tools 4. Return the tools to the store after completion of work	10
5. Identify the materials	1. Equipments and uses 2. Safety harness 3. Helmet 4. Gloves 5. Eye glasses earplugs 6. Nose mask etc. 7. Applications under different working condition	1. Identification of equipments like safety harness, helmet, gloves, eye glasses, earplugs, nose mask etc. 2. Demonstration of use of equipment like safety harness, helmet, gloves, eye glasses, earplugs, nose mask etc.	10

ORGANISATION OF FIELD VISITS

In a year, at least 3 field visits/educational tours should be organised for the students to expose them to the activities in the workplace.

Visit a distribution line, power substation, transmission line site, construction site. During the visit, students should obtain the following information from the Assistant engineer, supervisor and lineman of the centre.

1. Connection to the pole
2. Area under substation and its layout
3. Types of power cables
4. Type of connections
5. Methods of connecting and changing the cable
6. Fault identification and rectification of distribution line
7. Area required for the junction box installation
8. Mounting of the control panels
9. Wiring of the control panels
10. Connection of cable with the transformer
11. Types of joints in the cable
12. Procedure of fault checking
13. People and worker engaged