

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 01

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 01

I. PREPARATION:

Title: Safety induction & workshop orientation

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of safety induction & workshop orientation.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: previous safety awareness.

(2) Motivation: WCS: classification of unit systems and fundamental/derived units (FPS, CGS, MKS, SI). Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Institute electrical sections, scope of electrician trade, safety signs and hazards	• Identify the hazard and possible consequence • Apply isolation, PPE and safe working procedure • Use the correct emergency/fire/first-aid response • Report, secure the area and prevent recurrence	Demonstrate emergency response before practice. Use PPE and isolate the supply; never practise rescue on a live circuit. Use only the extinguisher type approved for electrical fire.
2) Electrical accident prevention, emergency response and first aid	• Identify the hazard and possible consequence • Apply isolation, PPE and safe working procedure • Use the correct emergency/fire/first-aid response • Report, secure the area and prevent recurrence	Demonstrate emergency response before practice. Use PPE and isolate the supply; never practise rescue on a live circuit. Use only the extinguisher type approved for electrical fire.

Developments / Topics	Information Points	Hints
3) Fire safety: electrical fire and correct extinguisher use	• Identify the hazard and possible consequence • Apply isolation, PPE and safe working procedure • Use the correct emergency/fire/first-aid response • Report, secure the area and prevent recurrence	Demonstrate emergency response before practice. Use PPE and isolate the supply; never practise rescue on a live circuit. Use only the extinguisher type approved for electrical fire.
4) PPE, housekeeping and waste disposal	• Identify the hazard and possible consequence • Apply isolation, PPE and safe working procedure • Use the correct emergency/fire/first-aid response • Report, secure the area and prevent recurrence	Demonstrate emergency response before practice. Use PPE and isolate the supply; never practise rescue on a live circuit. Use only the extinguisher type approved for electrical fire.

III. APPLICATION:

- 1) What is the purpose of safety induction & workshop orientation?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: classification of unit systems and fundamental/derived units (FPS, CGS, MKS, SI).

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 01; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 02 – Tools, standards & allied workshop practice

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 02

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 02

I. PREPARATION:

Title: Tools, standards & allied workshop practice

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of tools, standards & allied workshop practice.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Safety induction & workshop orientation.

(2) Motivation: WCS: measurement units and conversion used with workshop tools and dimensions. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Identify electrician trade tools and machines; safe lifting/handling	• Identify tool type, specification and intended use • Inspect condition before operation • Demonstrate correct grip, alignment and cutting/filing action • Clean, store and maintain the tool after use	Inspect tool condition and secure the workpiece. Wear eye protection for cutting/drilling. Clean and return tools after use.
2) Tool selection, safe operation, care and maintenance	• Identify tool type, specification and intended use • Inspect condition before operation • Demonstrate correct grip, alignment and cutting/filing action • Clean, store and maintain the tool after use	Inspect tool condition and secure the workpiece. Wear eye protection for cutting/drilling. Clean and return tools after use.

Developments / Topics	Information Points	Hints
3) BIS/ISI standards and introduction to National Electrical Code-2011	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Allied fitting tools: files, hammers, chisels, hacksaw and drills	• Identify tool type, specification and intended use • Inspect condition before operation • Demonstrate correct grip, alignment and cutting/filing action • Clean, store and maintain the tool after use	Inspect tool condition and secure the workpiece. Wear eye protection for cutting/drilling. Clean and return tools after use.

III. APPLICATION:

- 1) What is the purpose of tools, standards & allied workshop practice?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: measurement units and conversion used with workshop tools and dimensions.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 02; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 03 – Fundamentals of electricity

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 03

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 03

I. PREPARATION:

Title: Fundamentals of electricity

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of fundamentals of electricity.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Tools, standards & allied workshop practice.

(2) Motivation: WCS: fractions and practical fraction operations in workshop measurements. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Electric current, basic definitions, units and effects	• Define electrical quantity and SI unit • Distinguish conductor/insulator behaviour and applications • Relate current to its practical effects • Use correct symbols, units and terminology	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
2) Conductors and insulators; conducting materials	• Define electrical quantity and SI unit • Distinguish conductor/insulator behaviour and applications • Relate current to its practical effects • Use correct symbols, units and terminology	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) Comparison and selection of common conductor/insulator materials	• Define electrical quantity and SI unit • Distinguish conductor/insulator behaviour and applications • Relate current to its practical effects • Use correct symbols, units and terminology	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Basic electrical quantities and symbols used in workshop work	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of fundamentals of electricity?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: fractions and practical fraction operations in workshop measurements.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 03; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 04 – Cables, terminations & conductor measurement

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 04

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 04

I. PREPARATION:

Title: Cables, terminations & conductor measurement

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of cables, terminations & conductor measurement.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

- (1) Review: Fundamentals of electricity.
- (2) Motivation: WCS: factors and HCF problems applied to practical dimensions. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Prepare cable ends and terminations	• Identify cable construction, insulation and voltage grade • Select suitable size and stripping method • Prepare, terminate or test without damaging insulation • Check continuity/insulation and record observations	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.
2) Skinning, twisting and crimping techniques	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) Identify cable types and measure conductor size using SWG and micrometer	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.
4) Cable selection: size, insulation and voltage grade	• Identify cable construction, insulation and voltage grade • Select suitable size and stripping method • Prepare, terminate or test without damaging insulation • Check continuity/insulation and record observations	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.

III. APPLICATION:

- 1) What is the purpose of cables, terminations & conductor measurement?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: factors and HCF problems applied to practical dimensions.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 04; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 05 – Wire joints—basic forms

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 05

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 05

I. PREPARATION:

Title: Wire joints—basic forms

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of wire joints—basic forms.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Cables, terminations & conductor measurement.

(2) Motivation: WCS: LCM problems and common-denominator applications in workshop calculations. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Simple twist joint	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.
2) Married joint	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.

Developments / Topics	Information Points	Hints
3) Tee joint	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.
4) Western Union joint	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.

III. APPLICATION:

- 1) What is the purpose of wire joints—basic forms?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: LCM problems and common-denominator applications in workshop calculations.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 05; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 06 – Wire joints—overhead forms & soldering

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 06

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 06

I. PREPARATION:

Title: Wire joints—overhead forms & soldering

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of wire joints—overhead forms & soldering.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Wire joints—basic forms.

(2) Motivation: WCS: mixed unit-conversion problems and checking measured values. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Britannia straight joint	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.
2) Britannia Tee joint	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.

Developments / Topics	Information Points	Hints
3) Rat-tail joint	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.
4) Soldering of joints/lugs; solder and flux selection	• Clean and prepare joint/lug before soldering • Select suitable solder and flux; heat joint, not insulation • Allow solder to flow and cool without movement • Inspect for sound electrical/mechanical connection	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.

III. APPLICATION:

- 1) What is the purpose of wire joints—overhead forms & soldering?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: mixed unit-conversion problems and checking measured values.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 06; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 07 – Underground cable construction & joints

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 07

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 07

I. PREPARATION:

Title: Underground cable construction & joints

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of underground cable construction & joints.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Wire joints—overhead forms & soldering.

(2) Motivation: WCS: fractions in cable/joint dimensions and material preparation. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Identify underground-cable parts and insulation	• Identify cable construction, insulation and voltage grade • Select suitable size and stripping method • Prepare, terminate or test without damaging insulation • Check continuity/insulation and record observations	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.
2) Skinning and dressing underground cable	• Identify cable construction, insulation and voltage grade • Select suitable size and stripping method • Prepare, terminate or test without damaging insulation • Check continuity/insulation and record observations	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.

Developments / Topics	Information Points	Hints
3) Straight joint of different underground cables	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.
4) Cable precautions, voltage grades and joint protection	• Prepare conductor ends to the required length without nicking strands • Form the specified joint with correct wrapping/twisting sequence • Check mechanical strength and electrical continuity • Insulate/protect the completed joint as required	Demonstrate the joint step-by-step and inspect each learner's work. Do not nick conductor strands or overheat insulation. Check continuity and mechanical strength before insulation.

III. APPLICATION:

- 1) What is the purpose of underground cable construction & joints?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: fractions in cable/joint dimensions and material preparation.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 07; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 08 – Underground cable testing & fault removal

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 08

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 08

I. PREPARATION:

Title: Underground cable testing & fault removal

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of underground cable testing & fault removal.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

- (1) Review: Underground cable construction & joints.
- (2) Motivation: WCS: HCF/LCM revision through cable and testing examples. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Insulation-resistance testing with megger	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.
2) Fault testing in underground cables	• Identify cable construction, insulation and voltage grade • Select suitable size and stripping method • Prepare, terminate or test without damaging insulation • Check continuity/insulation and record observations	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.

Developments / Topics	Information Points	Hints
3) Locate and remove cable faults	• Identify cable construction, insulation and voltage grade • Select suitable size and stripping method • Prepare, terminate or test without damaging insulation • Check continuity/insulation and record observations	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.
4) Interpret test results and record maintenance observations	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of underground cable testing & fault removal?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: HCF/LCM revision through cable and testing examples.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 08; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 09 – Ohm's law & series/parallel circuits

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 09

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 09

I. PREPARATION:

Title: Ohm's law & series/parallel circuits

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of ohm's law & series/parallel circuits.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Underground cable testing & fault removal.

(2) Motivation: WCS: measurement conversion and numerical problems from electrical circuits. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Ohm's law and circuit variables	• Ohm's law: $V = I \times R$ • Select resistor/source values and meter ranges • Measure V and I; calculate and compare R • Record readings and plot V-I relationship	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.
2) Measure voltage/current for different resistor values and sources	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) Series and parallel resistor circuits	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Plot readings and compare with calculated values	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of ohm's law & series/parallel circuits?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: measurement conversion and numerical problems from electrical circuits.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 09; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 10 – Kirchhoff's laws & circuit faults

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 10

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 10

I. PREPARATION:

Title: Kirchhoff's laws & circuit faults

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of kirchhoff's laws & circuit faults.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Ohm's law & series/parallel circuits.

(2) Motivation: WCS: integrated revision—units, fractions, HCF/LCM and conversion. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Verify Kirchhoff's current and voltage laws	• KCL: algebraic sum of currents at a node is zero • KVL: algebraic sum of voltages in a closed loop is zero • Measure branch/loop quantities and compare with calculated values • Record deviations and identify likely connection errors	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.
2) Measure current and voltage in networks	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) Open and short circuits in series networks	• Open circuit: interrupted current path; short: very low-resistance path • Compare expected and measured V/I • Locate the abnormal section systematically • Restore the circuit and re-test	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Open and short circuits in parallel networks	• Open circuit: interrupted current path; short: very low-resistance path • Compare expected and measured V/I • Locate the abnormal section systematically • Restore the circuit and re-test	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of kirchhoff's laws & circuit faults?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: WCS: integrated revision—units, fractions, HCF/LCM and conversion.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 10; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 11 – Resistance measurement & temperature effects

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 11

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 11

I. PREPARATION:

Title: Resistance measurement & temperature effects

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of resistance measurement & temperature effects.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Kirchhoff's laws & circuit faults.

(2) Motivation: ED: drawing instruments, conventions, sheet sizes/layout and title block. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Laws of resistance and resistor types	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.
2) Measure resistance by voltage-drop method	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.

Developments / Topics	Information Points	Hints
3) Wheatstone bridge principle and measurement	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Thermal effect and change of resistance with temperature; series-parallel resistor verification	• Resistance changes with temperature; metallic conductors generally increase in R when heated • Apply controlled heating and measure resistance • Avoid overheating the test component • Plot/compare temperature versus resistance	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.

III. APPLICATION:

- 1) What is the purpose of resistance measurement & temperature effects?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: drawing instruments, conventions, sheet sizes/layout and title block.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 11; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 12 – Magnetism & electromagnetism

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 12

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 12

I. PREPARATION:

Title: Magnetism & electromagnetism

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of magnetism & electromagnetism.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

- (1) Review: Resistance measurement & temperature effects.
- (2) Motivation: ED: freehand geometrical figures and blocks with dimensions. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Magnetic poles and field plotting of a bar magnet	• Identify N/S poles and magnetic field direction • Plot field lines using compass/approved field-plotting method • Relate field pattern to magnetic material properties • Record observations with a labelled sketch	Use low-energy training equipment and observe coil ratings. Change connections only after isolation where induced voltage may occur. Ask learners to predict direction before observing.
2) Magnetic materials and properties	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Use low-energy training equipment and observe coil ratings. Change connections only after isolation where induced voltage may occur. Ask learners to predict direction before observing.

Developments / Topics	Information Points	Hints
3) Wind a solenoid and observe magnetic effect of current	• Current in a coil produces a magnetic field • Wind turns uniformly and observe polarity/field effect • Change current/direction and note field response • Keep coil current within its rated limit	Use low-energy training equipment and observe coil ratings. Change connections only after isolation where induced voltage may occur. Ask learners to predict direction before observing.
4) Principles and laws of electromagnetism	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of magnetism & electromagnetism?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: freehand geometrical figures and blocks with dimensions.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 12; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 13 – Electromagnetic induction & inductance

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 13

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 13

I. PREPARATION:

Title: Electromagnetic induction & inductance

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of electromagnetic induction & inductance.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Magnetism & electromagnetism.

(2) Motivation: ED: transferring measurements from objects to freehand sketches. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Direction of induced emf and current	• Changing magnetic flux induces emf; direction follows Lenz's law • Distinguish self and mutual induction • Measure R, impedance and inductance of a choke/coil • Compare measured response under specified conditions	Use low-energy training equipment and observe coil ratings. Change connections only after isolation where induced voltage may occur. Ask learners to predict direction before observing.
2) Self-induced emf and mutually induced emf	• Changing magnetic flux induces emf; direction follows Lenz's law • Distinguish self and mutual induction • Measure R, impedance and inductance of a choke/coil • Compare measured response under specified conditions	Use low-energy training equipment and observe coil ratings. Change connections only after isolation where induced voltage may occur. Ask learners to predict direction before observing.

Developments / Topics	Information Points	Hints
3) Generate mutually induced emf	• Changing magnetic flux induces emf; direction follows Lenz's law • Distinguish self and mutual induction • Measure R, impedance and inductance of a choke/coil • Compare measured response under specified conditions	Use low-energy training equipment and observe coil ratings. Change connections only after isolation where induced voltage may occur. Ask learners to predict direction before observing.
4) Measure resistance, impedance and inductance of choke coils	• Changing magnetic flux induces emf; direction follows Lenz's law • Distinguish self and mutual induction • Measure R, impedance and inductance of a choke/coil • Compare measured response under specified conditions	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.

III. APPLICATION:

- 1) What is the purpose of electromagnetic induction & inductance?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: transferring measurements from objects to freehand sketches.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 13; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 14 – Capacitors & AC fundamentals

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 14

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 14

I. PREPARATION:

Title: Capacitors & AC fundamentals

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of capacitors & ac fundamentals.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

- (1) Review: Electromagnetic induction & inductance.
- (2) Motivation: ED: freehand drawing of hand tools. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Capacitor types, functions and uses	• Identify capacitor type, capacitance and voltage rating • Charge, discharge and test using the approved method • For grouping, combine C values and verify voltage rating • Discharge before handling and record test results	Verify voltage rating and polarity where applicable. Discharge the capacitor before touching or rewiring. Never short a charged capacitor deliberately.
2) Charging, discharging and testing capacitors	• Identify capacitor type, capacitance and voltage rating • Charge, discharge and test using the approved method • For grouping, combine C values and verify voltage rating • Discharge before handling and record test results	Verify voltage rating and polarity where applicable. Discharge the capacitor before touching or rewiring. Never short a charged capacitor deliberately.

Developments / Topics	Information Points	Hints
3) Grouping capacitors for required capacitance and voltage rating	• Identify capacitor type, capacitance and voltage rating • Charge, discharge and test using the approved method • For grouping, combine C values and verify voltage rating • Discharge before handling and record test results	Verify voltage rating and polarity where applicable. Discharge the capacitor before touching or rewiring. Never short a charged capacitor deliberately.
4) DC vs AC; frequency, instantaneous/RMS/average value, peak/form factor	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of capacitors & ac fundamentals?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: freehand drawing of hand tools.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 14; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 15 – AC series circuits: RL, RC, RLC

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 15

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 15

I. PREPARATION:

Title: AC series circuits: RL, RC, RLC

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of ac series circuits: rl, rc, rlc.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Capacitors & AC fundamentals.

(2) Motivation: ED: angle, triangle, circle, rectangle, square and parallelogram. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Inductive and capacitive reactance	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
2) RL, RC and RLC series characteristics	• Relate R, XL, XC, impedance, phase and power factor • Connect the specified AC series/parallel network • Measure V, I and PF at selected conditions • Observe resonance and compare with expected behaviour	Use rated AC trainer values and correct meter connections. Make circuit changes only when isolated. Compare measured values with expected phase/PF behaviour.

Developments / Topics	Information Points	Hints
3) Measure current, voltage and power factor	• Distinguish active power, reactive power and power factor • Measure P, energy and PF for lagging/leading loads • Compare readings graphically with circuit condition • Note the effect of capacitive correction	Use rated AC trainer values and correct meter connections. Make circuit changes only when isolated. Compare measured values with expected phase/PF behaviour.
4) Series resonance frequency and effect	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of ac series circuits: rl, rc, rlc?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: angle, triangle, circle, rectangle, square and parallelogram.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 15; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 16 – AC parallel circuits & resonance

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 16

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 16

I. PREPARATION:

Title: AC parallel circuits & resonance

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of ac parallel circuits & resonance.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: AC series circuits: RL, RC, RLC.

(2) Motivation: ED: single-stroke lettering and numbering. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) RL, RC and RLC parallel characteristics	• Relate R, XL, XC, impedance, phase and power factor • Connect the specified AC series/parallel network • Measure V, I and PF at selected conditions • Observe resonance and compare with expected behaviour	Use rated AC trainer values and correct meter connections. Make circuit changes only when isolated. Compare measured values with expected phase/PF behaviour.
2) Measure current, voltage and power factor	• Distinguish active power, reactive power and power factor • Measure P, energy and PF for lagging/leading loads • Compare readings graphically with circuit condition • Note the effect of capacitive correction	Use rated AC trainer values and correct meter connections. Make circuit changes only when isolated. Compare measured values with expected phase/PF behaviour.

Developments / Topics	Information Points	Hints
3) Parallel resonance frequency and effect	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Vector relationship of current/voltage and impedance	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of ac parallel circuits & resonance?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: single-stroke lettering and numbering.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 16; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 17 – Single-phase power, energy & power factor

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 17

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 17

I. PREPARATION:

Title: Single-phase power, energy & power factor

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of single-phase power, energy & power factor.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: AC parallel circuits & resonance.

(2) Motivation: ED: dimensioning practice and arrowhead types. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Active and reactive power	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
2) Measure power and energy for lagging/leading power factor	• Distinguish active power, reactive power and power factor • Measure P, energy and PF for lagging/leading loads • Compare readings graphically with circuit condition • Note the effect of capacitive correction	Use rated AC trainer values and correct meter connections. Make circuit changes only when isolated. Compare measured values with expected phase/PF behaviour.

Developments / Topics	Information Points	Hints
3) Compare characteristics graphically	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Single-phase AC circuit problems and applications	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of single-phase power, energy & power factor?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: dimensioning practice and arrowhead types.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 17; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 18 – Three-phase systems—star/delta basics

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 18

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 18

I. PREPARATION:

Title: Three-phase systems—star/delta basics

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of three-phase systems—star/delta basics.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

- (1) Review: Single-phase power, energy & power factor.
- (2) Motivation: ED: symbolic representation and common electrical symbols. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Advantages of AC poly-phase systems	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
2) Three-phase star and delta connections	• Identify star and delta connection points • Relate line/phase voltage and current for balanced loads • Connect the trainer and verify phase relationships • Compare balanced and unbalanced load behaviour	Identify phases before connection and use the approved trainer. Use phase-sequence checking where specified. Simulate faults only on protected training equipment.

Developments / Topics	Information Points	Hints
3) Line and phase voltage/current relationships	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Balanced and unbalanced loads	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of three-phase systems—star/delta basics?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: symbolic representation and common electrical symbols.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 18; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 19 – Three-phase measurement & neutral effects

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 19

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 19

I. PREPARATION:

Title: Three-phase measurement & neutral effects

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of three-phase measurement & neutral effects.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

- (1) Review: Three-phase systems—star/delta basics.
- (2) Motivation: ED: reading simple electrical circuit diagrams. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Measure power/energy/power factor in three-phase circuits	• Distinguish active power, reactive power and power factor • Measure P, energy and PF for lagging/leading loads • Compare readings graphically with circuit condition • Note the effect of capacitive correction	Use rated AC trainer values and correct meter connections. Make circuit changes only when isolated. Compare measured values with expected phase/PF behaviour.
2) Identify neutral in 3-phase 4-wire system and phase sequence	• Identify neutral in a 3-phase 4-wire system • Determine phase sequence with a phase-sequence meter • Observe voltage/load changes when neutral is broken on a protected trainer • Restore normal connection and verify readings	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.

Developments / Topics	Information Points	Hints
3) Effect of broken neutral	- Identify neutral in a 3-phase 4-wire system - Determine phase sequence with a phase-sequence meter - Observe voltage/load changes when neutral is broken on a protected trainer - Restore normal connection and verify readings	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Measure balanced/unbalanced load behaviour and phase fault effects	- Define the topic and its purpose in electrician work - Identify relevant components/tools and their functions - Follow the specified practical sequence and observe results - Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of three-phase measurement & neutral effects?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: reading simple electrical circuit diagrams.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 19; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 20 – Cells, electrolysis & battery fundamentals

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 20

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 20

I. PREPARATION:

Title: Cells, electrolysis & battery fundamentals

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of cells, electrolysis & battery fundamentals.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

- (1) Review: Three-phase measurement & neutral effects.
- (2) Motivation: ED: reading electrical layout drawings. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Chemical effect of electric current and laws of electrolysis	• Define electrical quantity and SI unit • Distinguish conductor/insulator behaviour and applications • Relate current to its practical effects • Use correct symbols, units and terminology	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
2) Anodes and cathodes; electroplating/cathodic protection	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) Types of cells and applications	• Explain chemical action, anode/cathode and cell operation • Compare common cell types, ratings and applications • Connect cells in series/parallel for required voltage/current • Observe polarity, capacity and care requirements	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.
4) Advantages/disadvantages and selection of cells	• Explain chemical action, anode/cathode and cell operation • Compare common cell types, ratings and applications • Connect cells in series/parallel for required voltage/current • Observe polarity, capacity and care requirements	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.

III. APPLICATION:

- 1) What is the purpose of cells, electrolysis & battery fundamentals?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: reading electrical layout drawings.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 20; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 21 – Cell grouping & battery charging

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 21

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 21

I. PREPARATION:

Title: Cell grouping & battery charging

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of cell grouping & battery charging.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

- (1) Review: Cells, electrolysis & battery fundamentals.
- (2) Motivation: ED: freehand electrical symbols and circuit-diagram practice. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Use different cell types	• Explain chemical action, anode/cathode and cell operation • Compare common cell types, ratings and applications • Connect cells in series/parallel for required voltage/current • Observe polarity, capacity and care requirements	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.
2) Group cells for specified voltage/current	• Explain chemical action, anode/cathode and cell operation • Compare common cell types, ratings and applications • Connect cells in series/parallel for required voltage/current • Observe polarity, capacity and care requirements	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.

Developments / Topics	Information Points	Hints
3) Care while grouping cells	• Explain chemical action, anode/cathode and cell operation • Compare common cell types, ratings and applications • Connect cells in series/parallel for required voltage/current • Observe polarity, capacity and care requirements	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.
4) Battery charging circuits and charging types	• Lead-acid battery: cells, plates, electrolyte and terminals • Check condition, charging status and connections • Apply correct charging method and charging limits • Perform routine care and maintenance checks	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.

III. APPLICATION:

- 1) What is the purpose of cell grouping & battery charging?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: freehand electrical symbols and circuit-diagram practice.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 21; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 22 – Battery maintenance & testing

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 22

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 22

I. PREPARATION:

Title: Battery maintenance & testing

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of battery maintenance & testing.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

- (1) Review: Cell grouping & battery charging.
- (2) Motivation: ED: layout drawing interpretation for wiring practice. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Routine care and maintenance of batteries	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
2) Battery testing and condition assessment	• Lead-acid battery: cells, plates, electrolyte and terminals • Check condition, charging status and connections • Apply correct charging method and charging limits • Perform routine care and maintenance checks	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.

Developments / Topics	Information Points	Hints
3) Lead-acid battery construction and operation	• Lead-acid battery: cells, plates, electrolyte and terminals • Check condition, charging status and connections • Apply correct charging method and charging limits • Perform routine care and maintenance checks	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.
4) Charging safety precautions and test equipment	• Identify the hazard and possible consequence • Apply isolation, PPE and safe working procedure • Use the correct emergency/fire/first-aid response • Report, secure the area and prevent recurrence	Demonstrate emergency response before practice. Use PPE and isolate the supply; never practise rescue on a live circuit. Use only the extinguisher type approved for electrical fire.

III. APPLICATION:

- 1) What is the purpose of battery maintenance & testing?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: layout drawing interpretation for wiring practice.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 22; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 23 – Solar cells & PV grouping

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 23

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 23

I. PREPARATION:

Title: Solar cells & PV grouping

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of solar cells & pv grouping.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

- (1) Review: Battery maintenance & testing.
- (2) Motivation: ED: integrated drawing revision using tools, symbols and layouts. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Principle and operation of solar cell	• A solar cell converts light energy to electrical energy • Series connection raises voltage; parallel connection raises current capacity • Determine the number of cells for the required output • Verify output with a meter under safe conditions	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.
2) Series/parallel grouping of solar cells	• A solar cell converts light energy to electrical energy • Series connection raises voltage; parallel connection raises current capacity • Determine the number of cells for the required output • Verify output with a meter under safe conditions	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.

Developments / Topics	Information Points	Hints
3) Determine number of cells for specified voltage/current	• Explain chemical action, anode/cathode and cell operation • Compare common cell types, ratings and applications • Connect cells in series/parallel for required voltage/current • Observe polarity, capacity and care requirements	Check polarity before connecting groups. Avoid short circuits and observe charging limits. Use eye/hand protection and follow the trainer's safety procedure.
4) Determine grouping for a given power requirement	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of solar cells & pv grouping?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: integrated drawing revision using tools, symbols and layouts.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 23; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 24 – Conduits, accessories & installation practice

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 24

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 24

I. PREPARATION:

Title: Conduits, accessories & installation practice

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of conduits, accessories & installation practice.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Solar cells & PV grouping.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Identify conduit types and electrical accessories	• Select conduit/accessories and mark the route/layout • Cut, deburr and thread/fit as applicable • Lay conduit and route conductors without damaging insulation • Inspect mechanical joints and continuity before supply	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
2) Cutting and threading different conduit sizes	• Select conduit/accessories and mark the route/layout • Cut, deburr and thread/fit as applicable • Lay conduit and route conductors without damaging insulation • Inspect mechanical joints and continuity before supply	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

Developments / Topics	Information Points	Hints
3) Laying conduit installations	• Select conduit/accessories and mark the route/layout • Cut, deburr and thread/fit as applicable • Lay conduit and route conductors without damaging insulation • Inspect mechanical joints and continuity before supply	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
4) Electrical wiring rules and accessory identification	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

III. APPLICATION:

- 1) What is the purpose of conduits, accessories & installation practice?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 24; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 25 – Test boards, extension boards & protective devices

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 25

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 25

I. PREPARATION:

Title: Test boards, extension boards & protective devices

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of test boards, extension boards & protective devices.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Conduits, accessories & installation practice.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Prepare test/extension boards	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
2) Mount lamp holders, switches and sockets	• Relate illumination to light intensity, lumen and efficiency • Identify lamp type and application • Connect fitting/reflector and verify operation • Observe rated voltage, power and lamp-specific precautions	Use lamp-specific fittings/ballasts and rated supply. Allow hot lamps to cool before handling. Compare calculated and observed illumination where measurements are available.

Developments / Topics	Information Points	Hints
3) Mount fuses, relays, MCB, ELCB and MCCB	- Identify incoming, outgoing and protective-device terminals - Mount and wire MCB/ELCB/MCCB and distribution points correctly - Select cable size/current rating for the circuit - Inspect, test and document the completed board	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Cable grading and current ratings	- Identify cable construction, insulation and voltage grade - Select suitable size and stripping method - Prepare, terminate or test without damaging insulation - Check continuity/insulation and record observations	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.

III. APPLICATION:

- 1) What is the purpose of test boards, extension boards & protective devices?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 25; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 26 – PVC casing-capping wiring

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 26

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 26

I. PREPARATION:

Title: PVC casing-capping wiring

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of pvc casing-capping wiring.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Test boards, extension boards & protective devices.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Draw wiring layout and select point positions	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
2) PVC casing-capping installation	• Plan point locations and conductor routes • Cut and fix PVC casing/capping neatly • Terminate switches, holders and sockets correctly • Test continuity/insulation and inspect neatness	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

Developments / Topics	Information Points	Hints
3) Plan minimum-to-more point circuits over practical length	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Test continuity and insulation after wiring	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

III. APPLICATION:

- 1) What is the purpose of pvc casing-capping wiring?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 26; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 27 – Conduit wiring—two-way control

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 27

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 27

I. PREPARATION:

Title: Conduit wiring—two-way control

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of conduit wiring—two-way control.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: PVC casing-capping wiring.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) PVC conduit wiring practice	• Select conduit/accessories and mark the route/layout • Cut, deburr and thread/fit as applicable • Lay conduit and route conductors without damaging insulation • Inspect mechanical joints and continuity before supply	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
2) Control one lamp from two places	• Relate illumination to light intensity, lumen and efficiency • Identify lamp type and application • Connect fitting/reflector and verify operation • Observe rated voltage, power and lamp-specific precautions	Use lamp-specific fittings/ballasts and rated supply. Allow hot lamps to cool before handling. Compare calculated and observed illumination where measurements are available.

Developments / Topics	Information Points	Hints
3) Two-way switch connection and testing	• Two-way switching permits one lamp to be controlled from two locations • Identify common and traveller terminals • Route conductors and terminate in correct sequence • Test both switching positions before energization	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Troubleshoot incorrect switching	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of conduit wiring—two-way control?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 27; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 28 – Conduit wiring—three-way control

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 28

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 28

I. PREPARATION:

Title: Conduit wiring—three-way control

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of conduit wiring—three-way control.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Conduit wiring—two-way control.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Control one lamp from three places	• Three-location control uses two-way and intermediate switching arrangement • Identify common/traveller paths and intermediate terminals • Wire and test each switching combination • Correct faults only after isolation	Use lamp-specific fittings/ballasts and rated supply. Allow hot lamps to cool before handling. Compare calculated and observed illumination where measurements are available.
2) Intermediate switch concept and connections	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) Conduit layout and wire routing	• Select conduit/accessories and mark the route/layout • Cut, deburr and thread/fit as applicable • Lay conduit and route conductors without damaging insulation • Inspect mechanical joints and continuity before supply	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.
4) Testing and fault correction	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of conduit wiring—three-way control?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 28; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 29 – Sockets, lamps & switching combinations

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 29

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 29

I. PREPARATION:

Title: Sockets, lamps & switching combinations

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of sockets, lamps & switching combinations.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Conduit wiring—three-way control.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Control sockets and lamps in different combinations	• Relate illumination to light intensity, lumen and efficiency • Identify lamp type and application • Connect fitting/reflector and verify operation • Observe rated voltage, power and lamp-specific precautions	Use lamp-specific fittings/ballasts and rated supply. Allow hot lamps to cool before handling. Compare calculated and observed illumination where measurements are available.
2) Switching concepts and circuit planning	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) Domestic/industrial wiring types: power, control, communication and entertainment	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
4) Permissible load in sub-circuits and main circuit	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of sockets, lamps & switching combinations?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 29; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 30 – Consumer main board & distribution

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 30

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 30

I. PREPARATION:

Title: Consumer main board & distribution

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of consumer main board & distribution.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Sockets, lamps & switching combinations.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Wire consumer main board with MCB	• Identify incoming, outgoing and protective-device terminals • Mount and wire MCB/ELCB/MCCB and distribution points correctly • Select cable size/current rating for the circuit • Inspect, test and document the completed board	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.
2) Distribution board and fuse-box connections	• Identify incoming, outgoing and protective-device terminals • Mount and wire MCB/ELCB/MCCB and distribution points correctly • Select cable size/current rating for the circuit • Inspect, test and document the completed board	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

Developments / Topics	Information Points	Hints
3) Main/sub-circuit arrangement	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Inspection and testing of completed board	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

III. APPLICATION:

- 1) What is the purpose of consumer main board & distribution?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 30; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 31 – Energy meter board

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 31

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 31

I. PREPARATION:

Title: Energy meter board

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of energy meter board.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Consumer main board & distribution.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Prepare and mount energy meter board	• Identify meter terminals, incoming supply and load side • Mount meter board and associated protective accessories • Follow the approved connection diagram • Inspect and test before authorized energization	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
2) Energy-meter connection and terminals	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.

Developments / Topics	Information Points	Hints
3) Meter-board layout and accessory arrangement	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
4) Inspection and testing	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of energy meter board?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 31; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 32 – Wiring estimation & cost

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 32

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 32

I. PREPARATION:

Title: Wiring estimation & cost

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of wiring estimation & cost.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Energy meter board.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Estimate connected load	• Prepare connected-load schedule and circuit grouping • Select cable size and protective ratings • Prepare bill of material with quantities • Calculate material/labour cost and check units	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
2) Select cable size and current rating	• Identify cable construction, insulation and voltage grade • Select suitable size and stripping method • Prepare, terminate or test without damaging insulation • Check continuity/insulation and record observations	Show the correct stripping length and tool selection. Confirm conductor size/rating before termination. Keep exposed ends controlled and protect insulation.

Developments / Topics	Information Points	Hints
3) Prepare bill of material	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
4) Calculate wiring cost	• Prepare connected-load schedule and circuit grouping • Select cable size and protective ratings • Prepare bill of material with quantities • Calculate material/labour cost and check units	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

III. APPLICATION:

- 1) What is the purpose of wiring estimation & cost?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 32; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 33 – Residential wiring practice

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 33

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 33

I. PREPARATION:

Title: Residential wiring practice

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of residential wiring practice.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Wiring estimation & cost.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Residential/hostel wiring layout	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
2) Wiring as per IE rules	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

Developments / Topics	Information Points	Hints
3) Point wiring and distribution	- Identify incoming, outgoing and protective-device terminals - Mount and wire MCB/ELCB/MCCB and distribution points correctly - Select cable size/current rating for the circuit - Inspect, test and document the completed board	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
4) Inspection/testing of residential installation	- Define the topic and its purpose in electrician work - Identify relevant components/tools and their functions - Follow the specified practical sequence and observe results - Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of residential wiring practice?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 33; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 34 – Institute & workshop wiring

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 34

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 34

I. PREPARATION:

Title: Institute & workshop wiring

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of institute & workshop wiring.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Residential wiring practice.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Institute wiring layout	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
2) Workshop wiring and distribution	• Identify incoming, outgoing and protective-device terminals • Mount and wire MCB/ELCB/MCCB and distribution points correctly • Select cable size/current rating for the circuit • Inspect, test and document the completed board	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

Developments / Topics	Information Points	Hints
3) Special wiring for workshop applications	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
4) Inspection and testing	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of institute & workshop wiring?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 34; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 35 – Fault detection, repair & installation testing

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 35

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 35

I. PREPARATION:

Title: Fault detection, repair & installation testing

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of fault detection, repair & installation testing.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Institute & workshop wiring.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Test domestic wiring installations	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
2) Test industrial wiring installations	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.

Developments / Topics	Information Points	Hints
3) Locate wiring faults	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Follow the drawing, label conductors and keep routing neat. Isolate before rewiring; test continuity/insulation as applicable. Do not bypass protective devices.
4) Repair and re-test	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of fault detection, repair & installation testing?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 35; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 36 – Earthing installation

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 36

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 36

I. PREPARATION:

Title: Earthing installation

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of earthing installation.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Fault detection, repair & installation testing.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Importance and purpose of earthing	• Earthing provides a low-resistance path for fault current • Identify pipe/plate electrode arrangement and connections • Measure earth resistance with earth tester/megger • Verify earth-leakage protection using ELCB/relay trainer	Follow the earthing arrangement and IE requirements given in the syllabus. Use the earth tester/megger correctly. Keep the test area secure and connections tight.
2) Prepare pipe earthing	• Earthing provides a low-resistance path for fault current • Identify pipe/plate electrode arrangement and connections • Measure earth resistance with earth tester/megger • Verify earth-leakage protection using ELCB/relay trainer	Follow the earthing arrangement and IE requirements given in the syllabus. Use the earth tester/megger correctly. Keep the test area secure and connections tight.

Developments / Topics	Information Points	Hints
3) Prepare plate earthing	• Earthing provides a low-resistance path for fault current • Identify pipe/plate electrode arrangement and connections • Measure earth resistance with earth tester/megger • Verify earth-leakage protection using ELCB/relay trainer	Follow the earthing arrangement and IE requirements given in the syllabus. Use the earth tester/megger correctly. Keep the test area secure and connections tight.
4) Measure earth resistance with earth tester/megger; test earth leakage by ELCB/relay	• Identify incoming, outgoing and protective-device terminals • Mount and wire MCB/ELCB/MCCB and distribution points correctly • Select cable size/current rating for the circuit • Inspect, test and document the completed board	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.

III. APPLICATION:

- 1) What is the purpose of earthing installation?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 36; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 37 – Illumination laws & lamp types

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 37

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 37

I. PREPARATION:

Title: Illumination laws & lamp types

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of illumination laws & lamp types.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Earthing installation.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Laws of illumination and illumination factors	• Relate illumination to light intensity, lumen and efficiency • Identify lamp type and application • Connect fitting/reflector and verify operation • Observe rated voltage, power and lamp-specific precautions	Use lamp-specific fittings/ballasts and rated supply. Allow hot lamps to cool before handling. Compare calculated and observed illumination where measurements are available.
2) Intensity of light and lumen concept	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) Lamp types and applications	• Relate illumination to light intensity, lumen and efficiency • Identify lamp type and application • Connect fitting/reflector and verify operation • Observe rated voltage, power and lamp-specific precautions	Use lamp-specific fittings/ballasts and rated supply. Allow hot lamps to cool before handling. Compare calculated and observed illumination where measurements are available.
4) Advantages/disadvantages and lumens/efficiency calculations	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of illumination laws & lamp types?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 37; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 38 – Illumination installation & decorative circuits

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 38

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 38

I. PREPARATION:

Title: Illumination installation & decorative circuits

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of illumination installation & decorative circuits.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Illumination laws & lamp types.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Install light fittings with reflectors for direct/indirect lighting	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.
2) Group different wattage lamps in series for specified voltage	• Relate illumination to light intensity, lumen and efficiency • Identify lamp type and application • Connect fitting/reflector and verify operation • Observe rated voltage, power and lamp-specific precautions	Use lamp-specific fittings/ballasts and rated supply. Allow hot lamps to cool before handling. Compare calculated and observed illumination where measurements are available.

Developments / Topics	Information Points	Hints
3) Install fluorescent, mercury vapour, sodium vapour and metal-halide lamps	• Relate illumination to light intensity, lumen and efficiency • Identify lamp type and application • Connect fitting/reflector and verify operation • Observe rated voltage, power and lamp-specific precautions	Use lamp-specific fittings/ballasts and rated supply. Allow hot lamps to cool before handling. Compare calculated and observed illumination where measurements are available.
4) Prepare rotating/running light and show-case lighting	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of illumination installation & decorative circuits?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 38; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 39 – Analog/digital measuring instruments

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 39

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 39

I. PREPARATION:

Title: Analog/digital measuring instruments

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of analog/digital measuring instruments.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Illumination installation & decorative circuits.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Classification of electrical instruments and essential forces	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.
2) PMMC and moving-iron instruments	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.

Developments / Topics	Information Points	Hints
3) Analog and digital measuring instruments	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.
4) Measure electrical parameters using meters	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.

III. APPLICATION:

- 1) What is the purpose of analog/digital measuring instruments?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 39; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 40 – Three-phase instruments & power measurement

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 40

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 40

I. PREPARATION:

Title: Three-phase instruments & power measurement

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of three-phase instruments & power measurement.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Analog/digital measuring instruments.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Measure single/three-phase quantities with multimeter, wattmeter and energy meter	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Identify phases before connection and use the approved trainer. Use phase-sequence checking where specified. Simulate faults only on protected training equipment.
2) Phase-sequence and frequency meters	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.

Developments / Topics	Information Points	Hints
3) Two-wattmeter method for three-phase power	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Identify phases before connection and use the approved trainer. Use phase-sequence checking where specified. Simulate faults only on protected training equipment.
4) Power-factor meter and tong tester measurements	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.

III. APPLICATION:

- 1) What is the purpose of three-phase instruments & power measurement?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 40; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 41 – Smart meter & AMR concepts

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 41

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 41

I. PREPARATION:

Title: Smart meter & AMR concepts

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of smart meter & amr concepts.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Three-phase instruments & power measurement.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Smart meter physical and communication components	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.
2) Meter reading and installation	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.

Developments / Topics	Information Points	Hints
3) Diagnose smart-meter issues	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.
4) AMR, prosumer and distributed generation; tamper notifications	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of smart meter & amr concepts?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 41; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 42 – Instrument errors, range extension & calibration

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 42

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 42

I. PREPARATION:

Title: Instrument errors, range extension & calibration

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of instrument errors, range extension & calibration.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Smart meter & AMR concepts.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Errors and corrections in measurement	• Identify systematic/measurement error and correction method • Consider voltmeter loading and ammeter voltage-drop effects • Extend range using the approved method/trainer • Compare indication with a reference and calculate error	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.
2) Loading effect of voltmeter and voltage-drop effect of ammeter	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.

Developments / Topics	Information Points	Hints
3) Range extension and calibration of instruments	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Start on the highest safe range and select the correct function. Observe polarity and instrument category/rating. Compare with a known reference and record error.
4) Determine resistance-measurement error by voltage-drop method; test single-phase energy-meter error	• Select instrument type and range for the quantity being measured • Connect voltmeter in parallel and ammeter in series as applicable • Compare analog and digital readings • Record range, unit and observed value	Check polarity, meter range and circuit connections before energizing. Use calculated values as a pre-test check. Record readings in a table and discuss deviations.

III. APPLICATION:

- 1) What is the purpose of instrument errors, range extension & calibration?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 42; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 43 – Domestic appliances—disassembly & repair I

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 43

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 43

I. PREPARATION:

Title: Domestic appliances—disassembly & repair I

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of domestic appliances—disassembly & repair i.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Instrument errors, range extension & calibration.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Working principles/circuits of common domestic appliances	• Trace the appliance's basic circuit and identify major parts • Isolate supply before dismantling and label connections • Test suspected components with the correct instrument • Reassemble, verify insulation/earth and perform functional test	Disconnect and prove dead before dismantling. Label wires/parts and retain fasteners. Check insulation and protective earth before functional testing.
2) Dismantle and assemble cooking range, geyser, washing machine and pump set	• Trace the appliance's basic circuit and identify major parts • Isolate supply before dismantling and label connections • Test suspected components with the correct instrument • Reassemble, verify insulation/earth and perform functional test	Disconnect and prove dead before dismantling. Label wires/parts and retain fasteners. Check insulation and protective earth before functional testing.

Developments / Topics	Information Points	Hints
3) Service electric iron	- Trace the appliance's basic circuit and identify major parts - Isolate supply before dismantling and label connections - Test suspected components with the correct instrument - Reassemble, verify insulation/earth and perform functional test	Disconnect and prove dead before dismantling. Label wires/parts and retain fasteners. Check insulation and protective earth before functional testing.
4) Service electric kettle	- Trace the appliance's basic circuit and identify major parts - Isolate supply before dismantling and label connections - Test suspected components with the correct instrument - Reassemble, verify insulation/earth and perform functional test	Disconnect and prove dead before dismantling. Label wires/parts and retain fasteners. Check insulation and protective earth before functional testing.

III. APPLICATION:

- 1) What is the purpose of domestic appliances—disassembly & repair i?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 43; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 44 – Domestic appliances—repair II

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 44

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 44

I. PREPARATION:

Title: Domestic appliances—repair II

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of domestic appliances—repair ii.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Domestic appliances—disassembly & repair I.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Service and repair cooking range and geyser	• Trace the appliance's basic circuit and identify major parts • Isolate supply before dismantling and label connections • Test suspected components with the correct instrument • Reassemble, verify insulation/earth and perform functional test	Disconnect and prove dead before dismantling. Label wires/parts and retain fasteners. Check insulation and protective earth before functional testing.
2) Service induction heater and oven	• Trace the appliance's basic circuit and identify major parts • Isolate supply before dismantling and label connections • Test suspected components with the correct instrument • Reassemble, verify insulation/earth and perform functional test	Disconnect and prove dead before dismantling. Label wires/parts and retain fasteners. Check insulation and protective earth before functional testing.

Developments / Topics	Information Points	Hints
3) Service mixer and grinder	- Trace the appliance's basic circuit and identify major parts - Isolate supply before dismantling and label connections - Test suspected components with the correct instrument - Reassemble, verify insulation/earth and perform functional test	Disconnect and prove dead before dismantling. Label wires/parts and retain fasteners. Check insulation and protective earth before functional testing.
4) Service washing machine; neutral and earth concepts	- Identify neutral in a 3-phase 4-wire system - Determine phase sequence with a phase-sequence meter - Observe voltage/load changes when neutral is broken on a protected trainer - Restore normal connection and verify readings	Disconnect and prove dead before dismantling. Label wires/parts and retain fasteners. Check insulation and protective earth before functional testing.

III. APPLICATION:

- 1) What is the purpose of domestic appliances—repair ii?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 44; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 45 – Transformer fundamentals & single-phase tests

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 45

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 45

I. PREPARATION:

Title: Transformer fundamentals & single-phase tests

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of transformer fundamentals & single-phase tests.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) **Introduction**

(1) Review: Domestic appliances—repair II.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Transformer construction, classification and working principle	• Transformer transfers AC energy by mutual induction • Identify core, windings, terminals, cooling/protection and accessories • Apply the specified test/connection and record V, I and ratio results • Compare observations with the expected transformer behaviour	Use controlled trainer supply and correct meter range. Follow the specified OC/SC, regulation or connection procedure. Observe transformer-specific protection and never expose learners to unsafe HT work.
2) Identify terminals/components and calculate transformation ratio	• Define the topic and its purpose in electrician work • Identify relevant components/tools and their functions • Follow the specified practical sequence and observe results • Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

Developments / Topics	Information Points	Hints
3) EMF equation and single-phase transformer	- Transformer transfers AC energy by mutual induction - Identify core, windings, terminals, cooling/protection and accessories - Apply the specified test/connection and record V, I and ratio results - Compare observations with the expected transformer behaviour	Use controlled trainer supply and correct meter range. Follow the specified OC/SC, regulation or connection procedure. Observe transformer-specific protection and never expose learners to unsafe HT work.
4) Open-circuit and short-circuit tests; efficiency	- Define the topic and its purpose in electrician work - Identify relevant components/tools and their functions - Follow the specified practical sequence and observe results - Record measurements, checks and conclusions	Demonstrate the procedure, then use guided and individual practice. Check tool selection, sequence and safety before energizing/testing. Record results and give corrective feedback.

III. APPLICATION:

- 1) What is the purpose of transformer fundamentals & single-phase tests?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 45; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Week 46 – Transformer regulation, 3-phase operation & maintenance

LESSON PLAN

Trade: ELECTRICIAN / **College:** Debargha Memorial ITI

Module/Unit: Week 46

Date: As per Institute Schedule

Time: Weekly Plan

Lesson No: Week 46

I. PREPARATION:

Title: Transformer regulation, 3-phase operation & maintenance

1) **Objectives:** (At the end of the lesson the trainees will be able to)

1. Explain the key concepts and terminology of transformer regulation, 3-phase operation & maintenance.
2. Perform/describe the specified practical sequence safely and correctly.
3. Select appropriate tools, materials and measuring/testing instruments.
4. Apply the related safety, drawing and calculation requirements.

2) **Teaching Aids:** White board, marker, relevant tools/components, trainer/model, measuring instruments, PPE, worksheet/drawing sheet as applicable.

3) Introduction

(1) Review: Transformer fundamentals & single-phase tests.

(2) Motivation: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required. Connect the lesson to safe, accurate workshop practice.

II. PRESENTATION:

Developments / Topics	Information Points	Hints
1) Voltage regulation at different loads and power factors	• Distinguish active power, reactive power and power factor • Measure P, energy and PF for lagging/leading loads • Compare readings graphically with circuit condition • Note the effect of capacitive correction	Use rated AC trainer values and correct meter connections. Make circuit changes only when isolated. Compare measured values with expected phase/PF behaviour.
2) Series and parallel operation of two single-phase transformers	• Transformer transfers AC energy by mutual induction • Identify core, windings, terminals, cooling/protection and accessories • Apply the specified test/connection and record V, I and ratio results • Compare observations with the expected transformer behaviour	Use controlled trainer supply and correct meter range. Follow the specified OC/SC, regulation or connection procedure. Observe transformer-specific protection and never expose learners to unsafe HT work.

Developments / Topics	Information Points	Hints
3) Three-phase operation: delta-delta, delta-star, star-star, star-delta using three single-phase transformers	- Identify star and delta connection points - Relate line/phase voltage and current for balanced loads - Connect the trainer and verify phase relationships - Compare balanced and unbalanced load behaviour	Identify phases before connection and use the approved trainer. Use phase-sequence checking where specified. Simulate faults only on protected training equipment.
4) Transformer oil testing	- Transformer transfers AC energy by mutual induction - Identify core, windings, terminals, cooling/protection and accessories - Apply the specified test/connection and record V, I and ratio results - Compare observations with the expected transformer behaviour	Use controlled trainer supply and correct meter range. Follow the specified OC/SC, regulation or connection procedure. Observe transformer-specific protection and never expose learners to unsafe HT work.

III. APPLICATION:

- 1) What is the purpose of transformer regulation, 3-phase operation & maintenance?
- 2) Which tool/instrument and safety precaution are most important in this lesson?
- 3) How would you check the completed work before declaring it satisfactory?

Summary: Summarize the lesson with reference to the objectives. Emphasize: ED: interpret the relevant electrical circuit/layout drawing before practical work; dimension and label the drawing as required.

IV. TEST:

Assignment: Complete the practical record/worksheet for Week 46; draw the relevant circuit/layout or calculation where applicable, and list the safety checks used.

Reference: Electrician Trade – 1st Year CTS 2.0 / NSQF-4 syllabus supplied; Bharat Skills/NIMI-aligned Lesson Plan format.

Next Lesson: Course revision / final assessment