

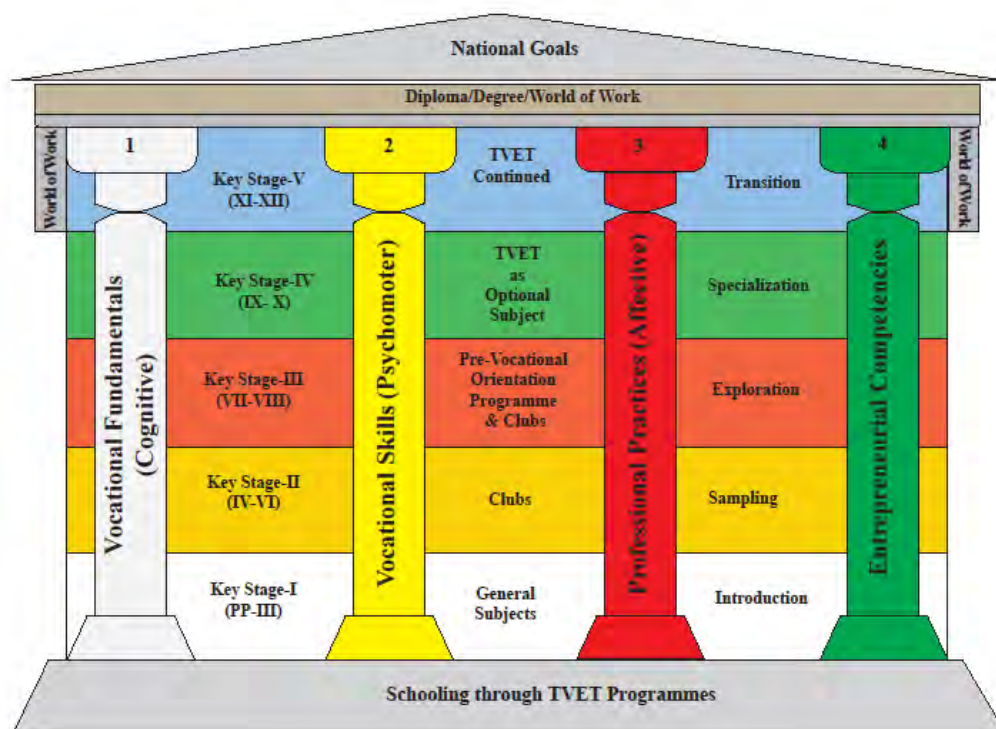
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET)

NEW NORMAL CURRICULUM

INSTRUCTIONAL GUIDE

(ELECTRICAL)

CLASS: X



Royal Education Council

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FOREWORD

COVID-19 has suddenly caused unforgiving disruptions in the public education all over the world, and brought about threats of fragmentation due to disparities in accessibility and connectivity in many systems. In Bhutan too, continuity of education and learning has been severely affected as a result of nationwide school closures and due to restrictions and health protocols. The disruptions have led to challenges in many existing patterns and trends in education resulting in a massive shift away from learning and teaching in traditional settings with physical interactions to the maximum in terms of relevancy and efficiency. This has caused a major problem for children living in poverty worldwide, who often rely on the physical settings of their schools for educational materials, guidance, and, sometimes, the only decent meal of the day.

In the new normal education, human interaction and well-being is a priority. Technology, particularly digital technology that enables communication, collaboration and learning across distance, is a formidable tool – not a panacea but a source of innovation and expanded potentials. As we embrace this exceptional opportunity to transform the world, and as we reimagine the organization of our educational institutions and learning environments, we will need to think about where we want to go.

In the post COVID 19 era, we must prioritize the development of the whole person not just academic knowledge. Inspiration for the change can be drawn from the 1996 Delors report, *Learning the treasure within*, in its specification of four pillars of learning as “learning to know”, “to do”, “to be”, and “to live together”. Therefore, curricula must be increasingly perceived as an integrated and based on themes and problems that allows learners to learn to live in peace with our common humanity and our common planet. This has the potential in the development of a strong base of knowledge about one’s self and about the world and find purpose and be better able to participate in social and political milieu.

The New Normal Curriculum is, not just a mere response to the pandemic, but also a culmination of the curriculum reform work for the last four years by the Royal Education Council. It is an attempt to transform education from the teaching of “what” to learning of “how” and “why” towards empowering learners with the transversal competencies and the 21st century skills, and preparing them to be lifelong learners. We are optimistic that this move orients our education process towards nurturing nationally rooted and globally competent citizens.

Wish all our learners and teachers a life enriching experiential teaching and learning.

Kinga Dakpa,

Director General

INTRODUCTION

Technical and Vocational Education and Training (TVET) is education and training which provides knowledge and skills for employment. It comprises of education, training and skills development related to a wide range of occupational fields, production, services and livelihood. The Royal Education Council and Ministry of Education envisage that the TVET curriculum has a place in the mainstream education system, as it is the case in most of the education systems of the developed world. The formal Technical and Vocational Education and Training (TVET) began in 1965 at Don Bosco Technical School (DBTS), in Kharbandi (presently known as Rinchening) in Phuntsholing. Even after that, major curriculum reform was planned by the then Department of Curriculum Research and Development (DCRD) under the Ministry of Education in an attempt to make education relevant to the Bhutanese society through diversification of Secondary Education Curriculum in the schools, which included the introduction of TVET.

As per ‘National Education Framework’ developed collaboratively by the Royal Education Council (REC) and the Ministry of Education (MoE), it provides a pathway on integrating technical/vocational education in the mainstream school education curriculum and as elective subjects in higher classes (NEF, 2009; page 64).

With the collaborative efforts of the Ministry of Labour and Human Resources and the erstwhile Department of Curriculum Research and Development under Ministry of Education, Vocational Curriculum has been introduced in the schools with assistance from TTIs since 2011. After the first MoU that was signed between MoE and MoLHR in 2011, the second MoU was signed again in 2014, to improve technical/vocational courses. The technical/vocational courses offered by the TTIs/IZCs are adapted and redesigned and are offered in schools aligning to the ‘Bhutan Education Blue Print’ 2014-2024, which recommends upscaling and diversification of TVET in schools through the provision of alternative pathways in schools and the tertiary education systems, owing to the limited access to such courses, despite the growing demand for technical skills in the country.

The resolutions of the National School Curriculum Conference 2016, also strongly emphasised the need to upscale and deepen TVET. Accordingly, the TVET framework is developed from classes PP to XII, schools equipped with necessary resources and instructors trained. Tripartite MoU among REC, MoE and MoLHR was also signed in 2018 to implement the programmes collaboratively.

Although the TVET curriculum is competency based with more emphasis on hands-on experience, further improvements have been made taking care of cognitive and affective domains besides psychomotor. Teaching and learning approaches have also been enriched with the recommendation to use ICT and online resources. Since the pandemic (COVID-19) has resulted in the closure of schools, it has taught us lessons to be prepared for such an untoward situation in the future. Thus, the New Normal Curriculum Instructional Guide is prepared not only to encourage blended learning but also to facilitate remote learning. Thus, the guide would help the schools to implement the curriculum effectively without limiting to contact teaching/learning besides using a variety of pedagogies.

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A. Learning objectives/ Broad theme / Strand/Chapter:

MODULE 1: Applying Fundamentals of Electricity

Chapter 4: Verifying AC circuits

Learning objectives	Core concepts (Chapters/Topics)
4.2.1 Explain the characteristics of a pure resistive circuit 4.2.2 Draw vector/ phasor diagram of the pure resistive circuit. 4.2.3 Verify characteristics of the pure resistive circuit. 4.2.4 <i>Ensure secure connections.</i> 4.2.5 <i>Ensure to verify the circuit connection</i>	4.2: Verifying characteristics of pure resistive circuit.

B. Competencies:

- ✓ Verify the characteristics of a pure resistive circuit to avoid the presence of inductance and capacitance in a purely resistive circuit

C. Pedagogy/Learning Experiences

• Contact:

- ✓ Make learners read INFORMATION SHEET 4.2
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=A_tNf7fAqEI with the learners which explains the pure resistive circuit.
- ✓ Make learners perform OPERATION SHEET 4.2
- ✓ Let the learners discuss in the group and do a presentation on resistive load using PPT, handouts, demonstration, and short video clips.

• Non-contact:

- ✓ Instruct learners to read INFORMATION SHEET 4.2 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=A_tNf7fAqEI that explains the pure resistive circuit.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

• Contact:

- ✓ Make learners read INFORMATION SHEET 4.2 and perform OPERATION SHEET 4.2 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about resistive circuits by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.2
- ✓ Let the learners do a presentation on the resistive circuit and assess as per the rubric developed.

• Non-contact:

- ✓ Make learners read INFORMATION SHEET 4.2 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.

- ✓ Let the student solve SAMPLE SELF CHECK 4.2 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use a rubric to assess their answers.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=A_tNf7fAqEI (Explanation of pure resistive circuit)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.3.1 Define inductor and inductance. 4.3.2 State the unit and symbol of an inductor. 4.3.3 Explain the characteristics of a pure inductive circuit 4.3.4 List the types of inductors. 4.3.5 State the application of inductors. 4.3.6 List the factors which affect the inductance of a coil. 4.3.7 Explain the vector/ phasor diagram of the pure inductive circuit. 4.3.8 Verify characteristics of the pure inductive circuit. 4.3.9 <i>Ensure secure connections.</i> 4.3.10 <i>Ensure to verify the circuit connection.</i> 4.3.11 <i>Ensure to check the functionality of CRO and function generator.</i>	4.3: Verifying characteristics of pure inductive circuit

B. Competencies:

- ✓ Verify the characteristics of a pure inductive circuit to avoid the presence of resistance and capacitance in a purely inductive circuit

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 4.3
 - ✓ Provide handouts to learners.
 - ✓ Share the web link <https://youtu.be/OK40hpVwbpM> with the learners which explains the characteristics of the pure inductive circuit.
 - ✓ Make learners perform OPERATION SHEET 4.3
 - ✓ Let the learners discuss in the group and do a presentation on an inductive circuit using PPT, handouts, demonstration, and short video clips.
- **Non-contact:**
 - ✓ Instruct learners to read INFORMATION SHEET 4.3 through Google Classroom.
 - ✓ Provide the web link <https://youtu.be/OK40hpVwbpM> that explains the characteristics of a pure inductive circuit.

- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group about characteristics of the pure inductive circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.3 and perform OPERATION SHEET 4.3 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess the learner’s knowledge about the characteristics of the pure inductive circuit by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.1
- ✓ Let the learners do a presentation on the inductive circuit and assess as per the rubric developed.

- **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 4.3 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.3 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ <https://youtu.be/OK40hpVwbpM> (Explanation on the characteristics of pure inductive circuit)
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.4.1 Define capacitor and capacitance.	4.4: Verifying characteristics of pure capacitive circuit
4.4.2 Explain the characteristics of a capacitive circuit.	
4.4.3 State the unit and symbol of the capacitor.	
4.4.4 List the types of capacitors.	
4.4.5 State the application of capacitor.	
4.4.6 List the factors which determine the value of capacitance.	
4.4.7 Identify series and parallel circuits of capacitance.	
4.4.8 Draw vector/ phasor diagram of the pure capacitive circuit.	
4.4.9 Verify characteristics of the pure capacitive circuit	
4.4.10 Ensure secure connections.	
4.4.11 Ensure to verify the circuit connections	

B. Competencies:

- ✓ Verify the characteristics of a pure capacitive circuit to avoid the presence of resistance and inductance in a purely capacitive circuit

C. Pedagogy/Learning Experiences**• Contact:**

- ✓ Make learners read INFORMATION SHEET 4.4
- ✓ Provide handouts to learners.
- ✓ Share the web link <https://youtu.be/mXu806LradM> with the learners which explains the capacitive circuit and its waveform.
- ✓ Make learners perform OPERATION SHEET 4.4
- ✓ Let the learners discuss in the group and do a presentation on the capacitive circuit using PPT, handouts, demonstration, and short video clips.

• Non-contact:

- ✓ Instruct learners to read INFORMATION SHEET 4.4 through Google Classroom.
- ✓ Provide the web link <https://youtu.be/mXu806LradM> that explains the capacitive circuit and its waveform.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group about the capacitive circuit and submit their responses through google classroom or any other relevant social media.

D. Assessment:**• Contact:**

- ✓ Make learners read INFORMATION SHEET 4.4 and perform OPERATION SHEET 4.4 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about capacitive circuits by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.4
- ✓ Let the learners do the presentation on the capacitive circuit and assess as per the rubric developed.

• Non-contact:

- ✓ Make learners read INFORMATION SHEET 4.4 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. assess them using the checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.4 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
 - ✓ Handouts
 - ✓ <https://youtu.be/mXu806LradM> (Explanation on the capacitive circuit and their waveform)
 - ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha.
-

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.5.1 Define Resistance and Inductor (RL) series circuit. 4.5.2 State the purpose of RL series circuit. 4.5.3 Draw vector/phasor diagram of RL series circuit. 4.5.4 Explain vector/phasor diagram of RL series circuit. 4.5.5 Verify characteristics of RL series circuit. 4.5.6 <i>Ensure secure connection.</i> 4.5.7 <i>Ensure safe handling of meters.</i> 4.5.8 <i>Ensure to check the connection of meters.</i> 4.5.9 <i>Ensure to verify the circuit connection.</i> 4.5.10 <i>Ensure to check the functionality of the meter</i>	4.5: Verifying characteristics of RL series circuit.

B. Competencies:

- ✓ Observe the characteristics of the RL series connection when working with AC supply.

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 4.5
 - ✓ Provide handouts to learners.
 - ✓ Share the web link <https://www.youtube.com/watch?v=5jI35F6kLa8> with the learners which explains the characteristics and phasor diagram of the RL series circuit.
 - ✓ Make learners perform OPERATION SHEET 4.5
 - ✓ Let the learners discuss in the group and do a presentation on the RL series circuit using PPT, handouts, demonstration, and short video clips.
- **Non-contact:**
 - ✓ Instruct learners to read INFORMATION SHEET 4.5 through Google Classroom.
 - ✓ Provide the web link <https://www.youtube.com/watch?v=5jI35F6kLa8> that explains the characteristics and phasor diagram of the RL series circuit.
 - ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
 - ✓ Let the learners discuss in the group about the RL series circuit and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 4.5 and perform OPERATION SHEET 4.5 and assess them using the checklist/performance guide. Provide necessary intervention.
 - ✓ Assess learner's knowledge about RL series circuit by asking questions.
 - ✓ Conduct class tests to assess their understanding.
 - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.5
 - ✓ Let the learners do the presentation on the RL series circuit and assess as per the rubric developed.

- **Non-contact:**
 - ✓ Make learners read INFORMATION SHEET 4.5 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
 - ✓ Let the student solve SAMPLE SELF CHECK 4.5 and submit answers through google classroom or any other relevant social media.
 - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ <https://www.youtube.com/watch?v=5jI35F6kLa8> (Explanation on the RL series circuit and their phasor diagram)
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.6.1 Define Resistance and Capacitance (RC) series circuit. 4.6.2 Explain vector/phasor diagram of RC series circuit. 4.6.3 Verifying characteristics of RC series circuit. 4.6.4 <i>Ensure secure connection.</i> 4.6.5 <i>Ensure safe handling of meters.</i> 4.6.6 <i>Ensure to check the connection of meters.</i> 4.6.7 <i>Ensure to verify the circuit connection.</i>	4.6: Verifying characteristics of RC series circuit

B. Competencies:

- ✓ Observe the characteristics of RC series connection when working with AC supply

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 4.6
 - ✓ Provide handouts to learners.
 - ✓ Share the web link <https://www.youtube.com/watch?v=b-4QwCOaLio> with the learners which explains the characteristics and phasor diagram of the RC series circuit.
 - ✓ Make learners perform OPERATION SHEET 4.6
 - ✓ Let the learners discuss in the group and do a presentation on the RC series circuit using PPT, handouts, demonstration, and short video clips.
- **Non-contact:**
 - ✓ Provide the handouts, self-made tutorial video clips.
 - ✓ The learners watch the link or refer to the handouts provided and take notes of the information.
<https://www.youtube.com/watch?v=b-4QwCOaLio> (Explanation on the RC series circuit and their phasor diagram)
 - ✓ Let the learners refer to Information sheet 4.6

- ✓ Learners answer Sample Self Check 4.6
- ✓ Instruct learners to read INFORMATION SHEET 4.6 through Google Classroom.
- ✓ Provide the web link <https://www.youtube.com/watch?v=b-4QwCOaLio> that explains the characteristics and phasor diagram of the RC series circuit.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group about the characteristics and phasor diagram of the RC series circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.6 and perform OPERATION SHEET 4.6 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about the characteristics of RC series circuit by asking questions.
- ✓ Conduct class test to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.6
- ✓ Let the learners do the presentation on characteristics of RC series circuit and assess as per the rubric developed.

- **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 4.6 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.6 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use a rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ <https://www.youtube.com/watch?v=b-4QwCOaLio> (Explanation on the RC series circuit and their phasor diagram)
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.7.1 Define Inductance and capacitance (LC) series circuit. 4.7.2 State the application of the LC series circuit. 4.7.3 Explain vector/phasor diagram of LC series circuit. iv. 4.7.4 Verify characteristic of LC series circuit. 4.7.5 <i>Ensure secure connection.</i> 4.7.6 <i>Ensure safe handling of meters.</i> 4.7.7 <i>Ensure to check the connection of meters.</i> 4.7.8 <i>Ensure to verify the circuit connection.</i>	4.7: Verifying characteristic of LC series circuit

B. Competencies:

- ✓ Observe the characteristics of LC series connection when working with AC supply

C. Pedagogy/Learning Experiences**• Contact:**

- ✓ Make learners read INFORMATION SHEET 4.7
- ✓ Provide handouts to learners.
- ✓ Make learners perform OPERATION SHEET 4.7
- ✓ Let the learners discuss in the group and do a presentation on the LC series circuit using PPT, handouts, demonstration, and short video clips.

• Non-contact:

- ✓ Instruct learners to read INFORMATION SHEET 4.7 through Google Classroom.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group about LC series circuit and submit their response through google classroom or any other relevant

D. Assessment:**• Contact:**

- ✓ Make learners read INFORMATION SHEET 4.7 and perform OPERATION SHEET 4.7 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about LC series circuit by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.7
- ✓ Let the learners do the presentation on the LC series circuit and assess as per the rubric developed.

• Non-contact:

- ✓ Make learners read INFORMATION SHEET 4.7 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.7 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use a rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.8.1 Define RLC series circuit. 4.8.2 Explain vector/phasor diagram of RLC series circuit. 4.8.3 State the application of the RLC series circuit. 4.8.4 Illustrate the waveform of the RLC series circuit. 4.8.5 Verify characteristic of RLC series circuit. 4.8.6 <i>Ensure secure connection.</i> 4.8.7 <i>Ensure safe handling of meters.</i> 4.8.8 <i>Ensure to check the connection of meters.</i> 4.8.9 <i>Ensure to verify the circuit connection.</i> 4.8.10 <i>Ensure to check the functionality of the meter.</i>	4.8: Verifying characteristic of RLC series circuit

B. Competencies:

- ✓ Verify series RLC circuit to check the working of a circuit containing multiple resistance, capacitance, and inductance

C. Pedagogy/Learning Experiences**• Contact:**

- ✓ Make learners read INFORMATION SHEET 4.8
- ✓ Provide handouts to learners.
- ✓ Share the web link https://youtu.be/O_ag3TicxJ4 with the learners which explains the RLC series circuit.
- ✓ Make learners perform OPERATION SHEET 4.8
- ✓ Let the learners discuss in the group and do a presentation on characteristics of the RLC series circuit using PPT, handouts, demonstration, and short video clips.

• Non-contact:

- ✓ Instruct learners to read INFORMATION SHEET 4.8 through Google Classroom.
- ✓ Provide the web link https://youtu.be/O_ag3TicxJ4 that explains the characteristics of the RLC series circuit.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in groups about characteristics of the RLC series circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:**• Contact:**

- ✓ Make learners read INFORMATION SHEET 4.8 and perform OPERATION SHEET 4.8 and assess them using the checklist/performance guide. Provide necessary intervention.
 - ✓ Assess learner's knowledge about characteristics of RLC series circuit by asking questions.
 - ✓ Conduct class test to assess their understanding.
 - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.8
-

- ✓ Let the learners do the presentation on characteristics of the RLC series circuit and assess as per the rubric developed.
- **Non-contact:**
 - ✓ Make learners read INFORMATION SHEET 4.8 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
 - ✓ Let the student solve SAMPLE SELF CHECK 4.8 and submit answers through google classroom or any other relevant social media.
 - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use a rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://youtu.be/O_ag3TicxJ4 (description of a circuit containing RLC connected in series)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.9.1 Define RL parallel circuit. 4.9.2 Explain vector/ phasor diagram of RL parallel circuit. 4.9.3 Verify characteristics of RL parallel circuit. 4.9.4 <i>Ensure secure connection.</i> 4.9.5 <i>Ensure safe handling of CRO.</i> 4.9.6 <i>Ensure to check the connection of meters.</i> 4.9.7 <i>Ensure to verify the circuit connection.</i> 4.9.8 <i>Ensure to check the functionality of the meters.</i>	4.9: Verifying characteristics of RL parallel circuit

B. Competencies:

- ✓ Verify characteristics of RL parallel circuit to check the working of a circuit containing resistance and inductance

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 4.9
 - ✓ Provide handouts to learners.
 - ✓ Share the web link <https://www.youtube.com/watch?v=rO-wSaR-a5k> with the learners which explains the characteristics of the RL parallel circuit.
 - ✓ Make learners perform OPERATION SHEET 4.9
 - ✓ Let the learners discuss in the group and do a presentation on RL parallel circuit using PPT, handouts, demonstration, and short video clips.
- **Non-contact:**
 - ✓ Instruct learners to read INFORMATION SHEET 4.9 through Google Classroom.

- ✓ Provide the web link <https://www.youtube.com/watch?v=rO-wSaR-a5k> that explains the characteristics of the RL parallel circuit.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group about characteristics of the RL parallel circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

• **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.9 and perform OPERATION SHEET 4.9 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner’s knowledge about characteristics of RL parallel circuit by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.9
- ✓ Let the learners do a presentation on the characteristic of the RL parallel circuit and assess as per the rubric developed.

• **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 4.9 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using a checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.9 and submit the answer through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ <https://www.youtube.com/watch?v=rO-wSaR-a5k> (Explanation on RL parallel circuit)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.10.1 Define RC parallel circuit. 4.10.2 Explain vector/phasor diagram of RC parallel circuit. <i>4.10.7 Ensure safe handling of instruments.</i> <i>4.10.8 Ensure to check the connection of meters.</i> <i>4.10.9 Ensure to verify the circuit connection.</i> 4.10.10 Verify characteristics of RC parallel circuit	4.10 Verifying characteristics of RC parallel circuit

B. Competencies:

- ✓ Verify characteristics of RC parallel circuit to check the working of a circuit containing resistance and inductance

C. Pedagogy/Learning Experiences

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.10
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=2DZ2_gW70R4 with the learners which explains the characteristics of RC parallel circuit.
- ✓ Make learners perform OPERATION SHEET 4.10
- ✓ Let the learners discuss in the group and do a presentation on characteristics of RC parallel circuit using PPT, handouts, demonstration and short video clips.

- **Non-contact:**

- ✓ Instruct learners to read INFORMATION SHEET 4.10 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=2DZ2_gW70R4 that explains the characteristics of RC parallel circuit.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group about the characteristics of the RC parallel circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.10 and perform OPERATION SHEET 4.10 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about the characteristics of RC parallel circuits by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.10
- ✓ Let the learners do the presentation on characteristics of RC parallel circuit and assess as per the rubric developed.

- **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 4.10 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. assess them using the checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.10 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

F. Resources (online and offline):

- ✓ Textbook (CBLM)
 - ✓ Handouts
 - ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
 - ✓ https://www.youtube.com/watch?v=2DZ2_gW70R4 (Explanation on RC parallel circuit)
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A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.11.1 Define LC parallel circuit. 4.11.2 Explain vector/phasor diagram of LC parallel circuit. 4.11.3 Verify characteristics of LC parallel circuit. 4.11.4 <i>Ensure secure connection.</i> 4.11.5 <i>Ensure safe handling of meters.</i> 4.11.6 <i>Ensure to check the connection of the meter</i> 4.11.7 <i>Ensure to verify the circuit connection.</i> 4.11.8 <i>Ensure to check the functionality of the meters</i>	4.11: Verifying characteristics of LC parallel circuit

B. Competencies:

- G. Verify characteristics of LC parallel circuit to check the working of a circuit containing resistance and inductance

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 4.11
 - ✓ Provide handouts to learners.
 - ✓ Share the web link https://www.youtube.com/watch?v=TJe0ye_Opgs with the learners which explains the characteristics of LC parallel circuit
 - ✓ Make learners perform OPERATION SHEET 4.11
 - ✓ Let the learners discuss in the group and do a presentation on LC parallel circuit using PPT, handouts, demonstration, and short video clips.

- **Non-contact:**
 - ✓ Instruct learners to read INFORMATION SHEET 4.11 through Google Classroom.
 - ✓ Provide the web link https://www.youtube.com/watch?v=TJe0ye_Opgs that explains the characteristics of LC parallel circuit.
 - ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
 - ✓ Let the learners discuss in the group about characteristics of the LC parallel circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 4.11 and perform OPERATION SHEET 4.11 and assess them using the checklist/performance guide. Provide necessary intervention.
 - ✓ Assess learner's knowledge about the characteristics of LC parallel circuits by asking questions.
 - ✓ Conduct class tests to assess their understanding.
 - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.11
 - ✓ Let the learners do the presentation on characteristics of LC parallel circuit and assess as per the rubric developed.

- **Non-contact:**
 - ✓ Make learners read INFORMATION SHEET 4.11 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
 - ✓ Let the student solve SAMPLE SELF CHECK 4.11 and submit answers through google classroom or any other relevant social media.
 - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
https://www.youtube.com/watch?v=TJe0ye_Opgs (Explanation on LC parallel circuit)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.12.1 Define RLC parallel circuit. 4.12.2 Explain vector/phasor diagram of RLC parallel circuit. 4.12.3 Verify characteristics of RLC parallel circuit. 4.12.4 <i>Ensure secure connection.</i> 4.12.5 <i>Ensure safe handling of meters.</i> 4.12.6 <i>Ensure to check the connection of meters.</i> 4.12.7 <i>Ensure to verify the circuit connection</i>	4.12: Verifying characteristic of RLC parallel circuit

B. Competencies:

- ✓ Verify parallel RLC circuit to check the working of a circuit containing multiple resistance, capacitance and inductance

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 4.12
 - ✓ Provide handouts to learners.
 - ✓ Share the web link https://www.youtube.com/watch?v=C6rYOpkD_Kg with the learners which explains the characteristics and phasor diagram of the RLC parallel circuit.
 - ✓ Make learners perform OPERATION SHEET 4.12
 - ✓ Let the learners discuss in the group and do a presentation on RLC parallel circuit using PPT, handouts, demonstration and short video clips.
- **Non-contact:**
 - ✓ The teacher provides the handouts, self-made tutorial video clips.
 - ✓ The learners watch the link or refer the handouts provided and take notes of the information.

- ✓ https://www.youtube.com/watch?v=C6rYOpkD_Kg (explains parallel RLC circuit and their phasor diagram)
- ✓ Instruct learners to read INFORMATION SHEET 1.1 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=C6rYOpkD_Kg that explains the characteristics and phasor diagram of the RLC parallel circuit.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group the characteristics of the RLC parallel circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

• **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.12 and perform OPERATION SHEET 4.12 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner’s knowledge about RLC parallel circuits by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4,12
- ✓ Let the learners do the presentation on RLC parallel circuit and assess as per the rubric developed.

• **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 4.12 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.12 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=C6rYOpkD_Kg (Explanation on parallel RLC circuit and their phasor diagram)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.13.1 Define phase sequence. 4.13.2 List the advantages of polyphase over single phase. 4.13.3 State the purpose of checking phase sequence. 4.13.4 Check phase sequence of 3 phase supply. 4.13.5 <i>Ensure to check the phase sequence within 30 seconds.</i>	4.13: Checking phase sequence of 3 phase supply

4.13.6 <i>Ensure to avoid the connection of phase sequence meter to three-phase supply more than 30 seconds.</i> 4.13.7 <i>Ensure safe handling of phase sequence meter.</i> 4.13.8 <i>Ensure to use appropriate PPE.</i>	
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B. Competencies:

- ✓ Determine the phase sequence of the supply voltage during the installation of a three-phase motor

C. Pedagogy/Learning Experiences**• Contact:**

- ✓ Make learners read INFORMATION SHEET 4.13
- ✓ Provide handouts to learners.
- ✓ Provide web link <https://www.youtube.com/watch?v=1a4kj3Nig0s> which explains the phase sequence of three-phase supply.
- ✓ Make learners perform OPERATION SHEET 4.13
- ✓ Let the learners discuss in the group and do a presentation on the phase sequence of the three-phase using PPT, handouts, demonstration, and short video clips.

• Non-contact:

- ✓ Instruct learners to read INFORMATION SHEET 4.13 through Google Classroom.
- ✓ Provide the web link <https://www.youtube.com/watch?v=1a4kj3Nig0s> that explains the phase sequence of three-phase supply.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group the phase sequence of three-phase and submit their response through google classroom or any other relevant social media.

D. Assessment:**• Contact:**

- ✓ Make learners read INFORMATION SHEET 4.13 and perform OPERATION SHEET 4.13 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about the phase sequence of three-phase by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.13
- ✓ Let the learners do a presentation on the phase sequence of three-phase and assess as per the rubric developed.

• Non-contact:

- ✓ Make learners read INFORMATION SHEET 4.13 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using a checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.13 and submit the answer through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google

Classroom or any other social media platforms. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ <https://www.youtube.com/watch?v=1a4kj3Nig0s> (Description of phase sequence of three-phase)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.14.1 Define phase voltage, phase current, line voltage, line current, balanced load and unbalanced load. 4.14.2 Draw the connection diagram of star balanced and unbalanced load. 4.14.3 Verify the characteristics of balanced and unbalanced load in star connection. 4.14.4 <i>Ensure secure connections.</i> 4.14.5 <i>Ensure proper selection of meter range.</i> 4.14.6 <i>Ensure all the loads are equal in star connections.</i> 4.14.7 <i>Ensure use of appropriate PPE.</i>	4.14: Verifying the characteristics of balanced and unbalanced load in star connection

B. Competencies:

- ✓ Determine the characteristics of load variation in star connection while finding the relationship between line voltage and line current, phase voltage and phase current.
- ✓ Determine the characteristics of load variation in 3-wire, 3-phase supply system while finding the relationship between line voltage and line current, phase voltage and phase current.

C. Pedagogy/Learning Experiences

• **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.14
- ✓ Provide handouts to learners.
- ✓ Provide web link <https://www.youtube.com/watch?v=nRzsH0plXIc> which explains the characteristics of balanced and unbalanced load in star connection
- ✓ Make learners perform OPERATION SHEET 4.14
- ✓ Let the learners discuss in a group and do a presentation on characteristics of balanced and unbalanced load in star connection using PPT, handouts, demonstration and short video clips.

• **Non-contact:**

- ✓ Instruct learners to read INFORMATION SHEET 4.14 through Google Classroom.
- ✓ Provide the web link <https://www.youtube.com/watch?v=nRzsH0plXIc> that explains the characteristics of balanced and unbalanced load in star connection.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.

- ✓ Let the learners discuss in the group about the characteristics of balanced and unbalanced load in star connection and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.14 and perform OPERATION SHEET 4.14 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner’s knowledge about the characteristics of balanced and unbalanced load in star connection by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.14
- ✓ Let the learners do a presentation on characteristics of balanced and unbalanced load in star connection and assess as per the rubric developed.

- **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 4.14 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using a checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.14 and submit the answer through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ <https://www.youtube.com/watch?v=nRzsH0plXIc> (characteristics of balanced and unbalanced load in star connection)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
4.14.1 State the application of the delta connection. 4.14.2 Draw the connection diagram of the delta connection. 4.14.3 Explain the difference between star and delta connection. 4.14.4 Verify the characteristics of a balanced delta load connection. 4.14.5 <i>Ensure secure connections.</i> 4.14.6 <i>Ensure proper selection of meter range.</i> 4.14.7 <i>Ensure all the loads are equal in delta connections</i>	4.15: Verifying the characteristics of balanced delta load connection

B. Competencies:

- ✓ Procedures determine the characteristics of balanced load in delta while finding the relationship between line voltage and current, phase voltage and current

C. Pedagogy/Learning Experiences

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.15
- ✓ Provide handouts to learners.
- ✓ Make learners perform OPERATION SHEET 4.15
- ✓ Let the learners discuss in a group and do a presentation on verifying the characteristics of balanced delta load connection using PPT, handouts, demonstration and short video clips.

- **Non-contact:**

- ✓ Instruct learners to read INFORMATION SHEET 4.15 through Google Classroom.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group about verify the characteristics of balanced delta load connection and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 4.15 and perform OPERATION SHEET 4.15 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about characteristics of balanced delta load connection by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.15
- ✓ Let the learners do a presentation on characteristics of balanced delta load connection and assess as per the rubric developed.

- **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 4.15 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using a checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.15 and submit answer through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text book/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

Chapter 5: Apply basic Electronics theory**A. Learning objectives/ Broad theme / Strand/Chapter:**

Learning objectives	Core concepts (Chapters/Topics)
<p>5.1.1 Define electronics components (resistor, inductor, capacitor, diode, Zener- diode and transistor).</p> <p>5.1.2 Explain the process of charging and discharging of capacitor.</p> <p>5.1.3 List the types of diodes and their applications.</p> <p>5.1.4 State the characteristics and application of Zener diode.</p> <p>5.1.5 Explain the transistor biasing and symbols.</p> <p>5.1.6 List the types of transistors and their characteristics.</p> <p>5.1.7 Test resistor, inductor, capacitor, diode, Zener-diode and transistor.</p> <p>5.1.8 <i>Ensure to select proper range of multimeter.</i></p> <p>5.1.9 <i>Ensure safe handling of multimeter.</i></p> <p>5.1.10 <i>Ensure safe handling of electronic components.</i></p> <p>5.1.11 <i>Ensure to identify the terminals of electronic components.</i></p> <p>5.1.12 <i>Ensure safe disposal of waste.</i></p>	5.1: Testing resistor, inductor, capacitor, diode, Zener-diode and transistor

B. Competencies:

- ✓ Check the functionality of resistor, inductor, capacitor, diode, Zener- diode and transistor while replacing electronics component in circuits

C. Pedagogy/Learning Experiences**• Contact:**

- ✓ Make learners read INFORMATION SHEET 5.1
- ✓ Provide handouts to learners.
- ✓ Provide the web link <https://www.youtube.com/watch?v=WeZC-zLZg4Q> with the learners which explains the about use of multimeter and test the working conditions of electronic components.
- ✓ Make learners perform OPERATION SHEET 5.1
- ✓ Let the learners discuss in group and do presentation on testing of resistor, inductor, capacitor, diode, Zener-diode and transistor using PPT, handouts, demonstration and short video clips.

• Non-contact:

- ✓ Instruct learners to read INFORMATION SHEET 5.1 through Google Classroom.
 - ✓ Provide the web link <https://www.youtube.com/watch?v=WeZC-zLZg4Q> that explains the use of multimeter and test the working conditions of electronic components.
 - ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
 - ✓ Let the learners discuss in group the use of multimeter and test the working conditions of electronic components and submit their response through google classroom or any other relevant social media.
-

D. Assessment:**• Contact:**

- ✓ Make learners read INFORMATION SHEET 5.1 and perform OPERATION SHEET 5.1 and assess them using checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about testing of resistor, inductor, capacitor, diode, Zener-diode and transistor by asking questions.
- ✓ Conduct class test to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 5.1
- ✓ Let the learners do presentation on testing of resistor, inductor, capacitor, diode, Zener-diode and transistor and assess as per the rubric developed.

• Non-contact:

- ✓ Make learners read INFORMATION SHEET 5.1 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 5.1 and submit answer through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text book/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ <https://www.youtube.com/watch?v=WeZC-zLZg4Q> (Explanation on use of multimeter and test the working conditions of electronic components)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
5.2.1 List the types of rectifier circuit. 5.2.2 State the functions of rectifier circuit. 5.2.3 List the advantages and disadvantages of half wave rectifier. 5.2.4 Explain the characteristics of half wave rectifier. 5.2.5 Explain the working principle of half wave rectifier 5.2.6 Verify half wave rectifier. 5.2.7 <i>Ensure secure connection.</i> 5.2.8 <i>Ensure safe handling of CRO.</i>	5.2: Verifying half wave rectifier

B. Competencies:

- ✓ Verify half wave rectifier to obtain the desired level of dc voltage

C. Pedagogy/Learning Experiences**• Contact:**

- ✓ Make learners read INFORMATION SHEET 5.2
 - ✓ Provide handouts to learners.
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- ✓ Provide web link <https://www.youtube.com/watch?v=STLPgPOTHoY> which explains the half wave rectifier.
 - ✓ Make learners perform OPERATION SHEET 5.2
 - ✓ Let the learners discuss in group and do presentation on verify half wave rectifier using PPT, handouts, demonstration and short video clips.

- **Non-contact:**

- ✓ Instruct learners to read INFORMATION SHEET 5.2 through Google Classroom.
- ✓ Provide the web link <https://www.youtube.com/watch?v=STLPgPOTHoY> that explains the half wave rectifier.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in group about half wave rectifier and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 5.2 and perform OPERATION SHEET 5.2 and assess them using checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about the half wave rectifier by asking questions.
- ✓ Conduct class test to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 5.2
- ✓ Let the learners do presentation on half wave rectifier and assess as per the rubric developed.

- **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 5.2 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 5.2 and submit answer through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text book/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha <https://www.youtube.com/watch?v=STLPgPOTHoY> (Description of half wave rectifier)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
5.3.1 Explain the types of full wave rectifier 5.3.2 Explain the working principle and characteristics of full wave rectifier. 5.3.3 Differentiate between full wave and half wave rectifier. 5.3.4 State the advantages and disadvantages of full wave rectifier. 5.3.5 Verify full wave rectifier. 5.3.6 <i>Ensure secure connection.</i> 5.3.7 <i>Ensure safe handling of CRO.</i> 5.3.8 <i>Ensure the functionality of the meters.</i>	5.3: Verifying full wave rectifier

B. Competencies:

- ✓ Verify full wave rectifier to convert AC (alternating current) to pulsating DC (direct current).

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 5.3
 - ✓ Provide handouts to learners.
 - ✓ Share the web link <https://www.youtube.com/watch?v=mPIH1OQeDcU> with the learners which explains the full wave rectifier
 - ✓ Make learners perform OPERATION SHEET 5.3
 - ✓ Let the learners discuss in the group and do a presentation on full wave rectifier using PPT, handouts, demonstration and short video clips.
- **Non-contact:**
 - ✓ Instruct learners to read INFORMATION SHEET 5.3 through Google Classroom.
 - ✓ Provide the web link <https://www.youtube.com/watch?v=mPIH1OQeDcU> that explains the full wave rectifier.
 - ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
 - ✓ Let the learners discuss in the group about the full-wave rectifier and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 5.3 and perform OPERATION SHEET 5.3 and assess them using the checklist/performance guide. Provide necessary intervention.
 - ✓ Assess learner's knowledge about full wave rectifier by asking questions.
 - ✓ Conduct class test to assess their understanding.
 - ✓ Let learners carry out activities of the SAMPLE SELF CHECK 5.3
 - ✓ Let the learners do the presentation on full wave rectifier and assess as per the rubric developed.
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- **Non-contact:**
 - ✓ Make learners read INFORMATION SHEET 5.3 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
 - ✓ Let the student solve SAMPLE SELF CHECK 5.3 and submit answers through google classroom or any other relevant social media.
 - ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ <https://www.youtube.com/watch?v=mPIH1OQeDcU> (Description of full wave rectifier)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
5.4.1 List the types of filter circuit. 5.4.2 State the characteristics and application of filter circuits. 5.4.3 Verify filter circuit 5.4.4 <i>Ensure secure connection.</i> 5.4.5 <i>Ensure safe handling of CRO.</i> 5.4.6 <i>Ensure to check the functionality of meters.</i> 5.4.7 <i>Ensure to maintain the polarity</i>	5.4: Verifying filter circuit

B. Competencies

- ✓ Verify filter circuit to pass dc and block ac signals.

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Make learners read INFORMATION SHEET 5.4
 - ✓ Provide handouts to learners.
 - ✓ Share the web link <https://www.youtube.com/watch?v=9x1Sjz-VPSg> with the learners which explains the filter circuit.
 - ✓ Make learners perform OPERATION SHEET 5.4
 - ✓ Let the learners discuss in the group and do a presentation on filter circuit using PPT, handouts, demonstration and short video clips.
- **Non-contact:**
 - ✓ Instruct learners to read INFORMATION SHEET 5.4 through Google Classroom.
 - ✓ Provide the web link <https://www.youtube.com/watch?v=9x1Sjz-VPSg> to the learners which explains the filter circuit.
 - ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
 - ✓ Let the learners discuss in group about the filter circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:**• Contact:**

- ✓ Make learners read INFORMATION SHEET 5.4 and perform OPERATION SHEET 5.4 and assess them using checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about the filter circuit by asking questions.
- ✓ Conduct class test to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 5.4
- ✓ Let the learners do presentation on filter circuit and assess as per the rubric developed.

• Non-contact:

- ✓ Make learners read INFORMATION SHEET 5.4 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 5.4 and submit answer through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text book/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
<https://www.youtube.com/watch?v=9x1Sjz-VPSg> (Explanation on filter and its type)

A. Learning objectives/ Broad theme / Strand/Chapter:

Learning objectives	Core concepts (Chapters/Topics)
5.5.1 List the types of voltage regulator 5.5.2 State the advantages and disadvantages of voltage regulator. 5.5.3 Explain the construction and function of voltage regulator. 5.5.4 Verify characteristics of voltage regulator circuit. 5.5.5 <i>Ensure secure connections.</i> 5.5.6 <i>Ensure safe handling of DC power supply and CRO.</i> 5.5.7 <i>Ensure the input voltage is less 24V.</i> 5.5.8 <i>Ensure to check the functionality of meters.</i>	5.5. Verifying characteristics of voltage regulator circuit.

B. Competencies

- ✓ Verify characteristics of voltage regulator circuit to regulate or vary the output voltage of the circuit

C. Pedagogy/Learning Experiences**• Contact:**

- ✓ Make learners read INFORMATION SHEET 5.5
 - ✓ Provide handouts to learners.
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- ✓ Share the web link <https://www.youtube.com/watch?v=OAoEWaGtQjs> with the learners which explains the characteristics of voltage regulator circuit.
 - ✓ Make learners perform OPERATION SHEET 5.5.
 - ✓ Let the learners discuss in the group and do a presentation on characteristics of voltage regulator circuit using PPT, handouts, demonstration, and short video clips.

- **Non-contact:**

- ✓ Instruct learners to read INFORMATION SHEET 5.5 through Google Classroom.
- ✓ Provide the web link <https://www.youtube.com/watch?v=OAoEWaGtQjs> that explains the characteristics of voltage regulator circuit.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Let the learners discuss in the group about the characteristics of voltage regulator circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- **Contact:**

- ✓ Make learners read INFORMATION SHEET 5.5 and perform OPERATION SHEET 5.5 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about the characteristics of voltage regulator circuit by asking questions.
- ✓ Conduct class test to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 5.5
- ✓ Let the learners do the presentation on characteristics of voltage regulator circuit and assess as per the rubric developed.

- **Non-contact:**

- ✓ Make learners read INFORMATION SHEET 5.5 and ask them to make notes send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 5.5 and submit answers through google classroom or any other relevant social media.
- ✓ Give additional relevant questions from other resources-Text books/Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms. Use the rubric to assess their answer.

E. Resources (online and offline):

- ✓ Textbook (CBLM)
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ <https://www.youtube.com/watch?v=OAoEWaGtQjs> (Interpretation on the difference between the characteristics of linear and switching voltage regulator)

Resources

- 1) Technical and Vocational Education and Training (TVET) New Normal Curriculum Framework (Classes: PP-XII)
- 2) Competency-Based Learning Materials (Electrical)

