National School Curriculum

INSTRUCTIONAL GUIDE FOR TVET (ELECTRICAL)

CLASSES IX & X

Department of Curriculum and Professional Development
Ministry of Education, Royal Government of Bhutan

“Your parents, relatives, and friends would be very proud of what you have achieved. At your age, to have completed your studies is your personal accomplishment. Your knowledge and capabilities are a great asset for the nation. I congratulate you for your achievements. Finally, your capabilities and predisposition towards hard work will invariably shape the future of Bhutan. You must work with integrity, you must keep learning, keep working hard, and you must have the audacity to dream big.”

- His Majesty Jigme Khesar Namgyel Wangchuck

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Foreword

COVID-19 has suddenly caused unforgiving disruptions in 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 teaching and learning in traditional settings.

In the new normal education, human interaction and well-being are a priority. Digital technology that enables communication, collaboration and learning across distance, is 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 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 National School 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 then 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.

Tashi Delek.

Tashi Namgyal

Director

Introduction

Technical and Vocational Education and Training (TVET) is aimed at providing knowledge and skills for employment. It comprise education, training and skills development related to a wide range of occupational fields, production, services and livelihood. The Department of Curriculum and Professional Development, Ministry of Education envisages 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 Rinchending) in Phuntsholing. Even after that, major curriculum reform was planned by the then Department of Curriculum Research and Development (DCRD) 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, 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 the then 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 National School Curriculum Instructional Guide is prepared not only to encourage blended learning but also to facilitate remote learning. The guide would help the schools to implement the curriculum effectively without limiting to contact teaching/learning besides using a variety of pedagogies.

Purpose of the Instructional Guide

Among the many definitions of 'curriculum' this Instructional Guide underscores the meaning of curriculum as a standard and competency-based sequence of planned learning experiences where learners practise and achieve the proficiency in applying the learning experiences in real life scenarios. These proficiencies, in the curriculum framework, have been stated as "competencies" and 'objectives" for each class. In keeping with the principle, 'less is more' as stated the National School Curriculum, the contents of the curriculum have been reworked, so that learners can be engaged more in activities that can lead to the acquisition of required skills rather than having them 'cover the syllabus'.

This Instructional Guide believes that the classroom teachers, as professional individuals, can make the most authentic and reliable judgment about each learner's learning needs and the learning experiences to be provided to propel the learners in the learning continuum. With these beliefs and principles as the background, the following are the purposes of this document.

- Facilitate learners acquire required skills and competencies.
- Strengthen blended learning, including flipped classroom with multimedia, digital pedagogies and ICT devices and websites as tools to share the responsibility of learning amongst the learners, teachers, the parents and other stakeholders.
- Facilitate the use of Continuous Formative Assessment for learning using diverse appropriate assessment techniques and tools commensurate with individual differences in learning, and gather evidence to guide planning of educational programmes and activities for learners.
- Promote inclusive learning through the blended learning which facilitates learning anywhere, any time with the learner being responsible for the learning.
- Provide suggestive means of acquiring required skills by building interrelationship among, and through, the integration of the four strands of the curriculum.
- Help teachers assume the roles of facilitator, guide, motivator and evaluator.
- Guide teachers, parents and other stakeholders in helping learners achieve their potential.
- Empower teachers to design their own 'course of study' or 'class curriculum' for their students in line with the National School Curriculum Framework.
- Enhance sharing the burden of responsibility and accountability for learning amongst the stakeholders, including the learners themselves.

In this age of advanced communication and information technology, contents are widely available from a number of sources. Therefore, the teachers can select, structure and sequence the contents as required to best suit the learners' need while maintaining coherence and consistency. In other words, while the contents of the curriculum are negotiable, the competencies and objectives are not. While, teachers may have access to number of materials, it should be kept in mind that the teaching and learning should be focused on achieving the competencies rather than 'covering of the syllabus'. The teaching learning materials should be used as means to create a learning environment that is competency-based where the learners need to master the skills presented to them. While designing lesson plans and teaching learning activities, teachers need to ensure that the materials are relevant and appropriate for the given task.

The assessment should be competency-based wherein the teachers should assess the learners' mastery of the skills stated as competencies and objectives for each class. Teachers should use appropriate assessment tools and techniques depending on the nature of the learning activities. The learners should be clearly informed about the success criteria, the areas of assessment and the tools to be used so that they know exactly what tasks are to be performed or expected of them. In the process of the performance, the teacher should continuously provide feedback and, if necessary, modify instructions. Efforts have to be made to ensure that every learner has mastered the skills.

TABLE OF CONTENT

Class IX

MODULE 1: APPLY FUNDAMENTAL OF ELECTRICITY

Chapter 1: Practising Occupational Health and Safety (OHS)

A. Competency/Competencies:

- ✓ Apply the principle of 5S to organize and manage the workplace

B. Learning objectives/Topic:

Learning objectives	Topic
1.1.1 Define 5S. 1.1.2 State the purposes of 5S 1.1.3 Explain the principle of 5S 1.1.4 Define OHS 1.1.5 State the importance of OHS. 1.1.6 Explain the rights of the employee 1.1.7 State the main causes of accidents 1.1.8 State the safety rules. 1.1.9 Apply the principles of 5S	1.1 Applying the principles of 5S Overview: The topic is about the ways of organizing and managing the workplace that enable the learners to perform their tasks effectively and efficiently.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.1
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://youtu.be/n9sxq34D9HQ that explains the principle of 5S.
- ✓ Make learners perform OPERATION SHEET 1.1
- ✓ Let the learners discuss in the group and do a presentation on 5S using PPT, handouts, demonstration, and short video clips to explain 5S.
- ✓ Instruct learners to read INFORMATION SHEET 1.1 through Google Classroom.
- ✓ Provide the web link https://youtu.be/n9sxq34D9HQ that explains the principle of 5S.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 1.1 through Google Classroom. (The learners may arrange available tools and materials at home)
- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.1 and perform OPERATION SHEET 1.1 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about 5S 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 and assess as per the rubric developed.

- ✓ Make learners read INFORMATION SHEET 1.1 and perform OPERATION SHEET 1.1 and ask them to send the short video 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 1.1 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:

- ✓ Competency Based Learning Materials
- ✓ Handouts
- ✓ https://youtu.be/n9sxq34D9HQ (Explanation on principles of 5S)

A. Competency/Competencies:

- ✓ Use PPE to protect from workplace hazards.

B. Learning objectives/Topic:

Learning objectives	Topic
1.2.1 Define PPE. 1.2.2 State the importance of PPE. 1.2.3 List the categories of PPE. 1.2.4 *Ensure to use appropriate PPE.* 1.2.5 *Ensure safe disposal of damaged PPE.* 1.2.6 *Ensure not to use defective and damaged PPE.* 1.2.7 Use PPE	1.2 Using PPE **Overview:** The topic is about the proper use of various PPE and it helps the learners to maintain safety at workplace.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.2
- ✓ Provide handouts to learners.
- ✓ Provide the web links https://youtu.be/r9vp1q1L2ro and https://www.youtube.com/watch?v=DMBrRNV9Hrk that explain about PPE.
- ✓ Make learners perform OPERATION SHEET 1.2
- ✓ Let the learners discuss in the group and do a presentation on PPE using PPT, handouts, demonstration, and short video clips to explain PPE.
- ✓ Instruct learners to read INFORMATION SHEET 1.2through Google Classroom.
- ✓ Provide the web link https://youtu.be/r9vp1q1L2ro, https://www.youtube.com/watch?v=DMBrRNV9Hr that explains PPE.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 1.2 through Google Classroom.

- ✓ Let the learners discuss in a group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.2 and perform OPERATION SHEET 1.2 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about PPE by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.2
- ✓ Let the learners do a presentation and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 1.2 and ask them to make notes and 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 1.2 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 answer.

E. Resources:

- ✓ Competency-Based Learning Materials for class IX.
- ✓ https://www.youtube.com/watch?v=DMBrRNV9Hr and https://youtu.be/r9vp1q1L2ro (explanation on PPE)

A. Competency/Competencies:

- ✓ Maintain workplace and personal safety to reduce the risk in the workplace.

B. Learning objectives/Topic:

Learning objectives	Topic
1.3.1 Define safety precaution. 1.3.2 List different types of safety. 1.3.3 Explain workshop and personal safety. 1.3.4 State the importance of maintaining a workplace and personal safety. 1.3.5 Explain the importance of safety signs and symbols. 1.3.6 Explain the emergency exit. 1.3.7 Describe the layout of the workshop. 1.3.8 *Ensure to follow OHS procedures.* 1.3.9 *Ensure to keep the workshop clean.* 1.3.10 *Ensure to ring the alarm bell before the accident spreads over.*	1.3 Maintaining workplace safety and personal safety. **Overview:** The learners can maintain a workplace and personal safety knowing about safety signs and symbols and ways of setting conducive workshop.

1.3.11 *Ensure to display safety signs and symbols.* 1.3.12 *Ensure to use appropriate PPE in the workplace.* 1.3.13 *Ensure to avoid horseplay at the workplace.* 1.3.14 *Ensure to avoid smoking and eating inside the workshop.* 1.3.15 *Ensure to avoid working under influence of alcohol.* 1.3.16 Maintain workplace safety and personal safety.	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.3
- ✓ Provide handouts to learners.
- ✓ Provide the web links https://www.youtube.com/watch?v=4bkr5lpKGUM and https://www.youtube.com/watch?v=WW0U6o1XNec which explain the maintaining of the workplace and personal safety.
- ✓ Make learners perform OPERATION SHEET 1.3
- ✓ Let the learners discuss in the group and do a presentation on maintaining a workplace and personal safety using PPT, handouts, demonstration, and short video clips to explain maintaining of the workplace and personal safety.
- ✓ Instruct learners to read INFORMATION SHEET 1.3 through Google Classroom.
- ✓ Provide the web links https://www.youtube.com/watch?v=4bkr5lpKGUM and https://www.youtube.com/watch?v=WW0U6o1XNec that explain the maintaining of the workplace and personal safety.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 1.3 through Google Classroom.
- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.3 and perform OPERATION SHEET 1.3 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about maintaining a workplace and personal safety by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.3
- ✓ Let the learners do a presentation and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 1.3 and ask them to make notes and 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 1.3 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 a rubric to assess their answer.

E. Resources:

- ✓ CBLM of Classes IX and X, REC
- ✓ https://www.youtube.com/watch?v=WW0U6o1XNec and https://www.youtube.com/watch?v=4bkr5lpKGUM (video on workplace and personal safety)

A. Competency/Competencies:

- ✓ Maintain hand tools and equipment safety to increase the efficiency of tools and equipment.

B. Learning objectives/Topic:

Learning objectives	Topic
1.4.1 Explain tools and equipment safety. 1.4.2 State the importance of maintaining tools and equipment safety. 1.4.3 List do's and don'ts of tools and equipment. 1.4.4 *Ensure all the tools are in workable condition* 1.4.5 *Ensure to keep tools clean and dry, and store them properly after use.* 1.4.6 *Ensure to operate the machine when instructed.* 1.4.7 *Ensure to refer manual prior to operation of tools and equipment* 1.4.8 Maintain tools and equipment safety	1.4 Maintaining tools and equipment safety **Overview:** The topic covers information on the ways of maintaining tools and equipment safety thereby increasing the efficiency of tools and equipment.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.4
- ✓ Provide handouts to learners.
- ✓ Provide the web links https://www.bramptonguardian.com or http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php which explains about maintaining tools and equipment safety.
- ✓ Make learners perform OPERATION SHEET 1.4
- ✓ Let the learners discuss in the group and do a presentation on Maintaining tools and equipment safety using PPT, handouts, demonstration, and short video clips to explain Maintaining tools and equipment safety.
- ✓ Instruct learners to read INFORMATION SHEET 1.4 through Google Classroom.
- ✓ Provide the web links https://www.bramptonguardian.com or http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php that explains about the Maintain tools and equipment safety.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.

- ✓ Instruct learners to perform OPERATION SHEET 1.4 through Google Classroom. (The learners may arrange available tools and materials at home)
- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.4 and perform OPERATION SHEET 1.4 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about maintaining tools and equipment safety by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.4
- ✓ Let the learners do a presentation on maintaining tools and equipment safety and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 1.4 and ask them to make notes and 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 1.4 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 a rubric to assess their answer.

E. Resources:

- ✓ Competency Based Learning Materials for Classes IX, REC
- ✓ https://www.bramptonguardian.com or http://www.ehsdb.com/dos-and-donts--hand-tools-equipments.php (video explain on Maintaining tool and equipment safety)

A. Competency/Competencies:

- ✓ Use a fire extinguisher to combat the fire.

B. Learning objectives/Topic:

Learning objectives		Topic
1.5.1	Define fire extinguisher.	1.5 Using fire extinguisher **Overview:** The use of different fire extinguishers are covered and it enables the learners to operate them appropriately.
1.5.2	Label the parts of the fire extinguisher.	
1.5.3	Explain the types of fire.	
1.5.4	List types of fire extinguishers.	
1.5.5	State the method of combating/extinguishing fires.	
1.5.6	*Ensure to read the instructions provided on the fire extinguisher.*	
1.5.7	*Ensure appropriate use of PPE.*	
1.5.8	Use fire extinguisher	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.5
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://www.youtube.com/watch?v=PQV71INDaqY that explains the usage of fire extinguishers.
- ✓ Make learners perform OPERATION SHEET 1.5
- ✓ Let the learners discuss in the group and do a presentation on how to use fire extinguishers using PPT, handouts, demonstration, and short video clips to explain the usage of fire extinguishers.
- ✓ Instruct learners to read INFORMATION SHEET 1.5 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=PQV71INDaqY that explains about usage of fire extinguisher.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 1.5 through Google Classroom. (The learners may arrange available tools and materials at home)
- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.5 and perform OPERATION SHEET 1.5 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about how to use fire extinguishers by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.5
- ✓ Let the learners do a presentation on using of fire extinguisher and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 1.5 and ask them to make notes and 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 1.5 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. Use a rubric to assess their answer.

E. Resources:

- ✓ CBLM for Classes IX, REC
- ✓ https://www.youtube.com/watch?v=PQV71INDaqY (Video on how to use fire extinguisher)

Chapter 2: Applying basic electrical theory

A. Competency/Competencies:

- ✓ Test to check continuity of conductor, insulator and semiconductor.

B. Learning objectives/Topic:

Learning objectives	Topic
2.1.1 Introduction to Electricity 2.1.2 Explain generation of electricity 2.1.3 Describe trends and scope of Domestic wiring technician 2.1.4 Define conductor, insulator and semiconductor 2.1.5 Explain the properties of conductor, insulator and semiconductor 2.1.6 Differentiate among conductors, insulators and semiconductors 2.1.7 ***Use multimeter*** 2.1.8 ***Use IR Tester*** 2.1.9 *Be responsible and vigilant while following testing* 2.1.10 *Ensure safe handling of instruments.*	2.1. Testing conductors, semiconductors and insulator **Overview:** The learner will be able to differentiate among conductors, insulators and semi-conductor besides knowing its properties. They can also use multimeter and IR tester.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.1
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://www.youtube.com/watch?v=0NBTvJF6ghQ&t=72s that explains the types and characteristics of conductor, semiconductor and insulator.
- ✓ Make learners perform OPERATION SHEET 2.1
- ✓ Let the learners discuss in the group and do a presentation on the conductor, semiconductor and insulator using PPT, handouts, demonstration, and short video clips to explain conductor, semiconductor, and insulator.
- ✓ Instruct learners to read INFORMATION SHEET 2.1 through Google classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=0NBTvJF6ghQ&t=72s that explains the types and characteristics of conductor, semiconductor, and insulator.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 2.1 through Google Classroom.

- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.1 and ask them to make notes and send as evidence through google classroom. Provide necessary feedback.
- ✓ Assess learner's knowledge about conductor, semiconductor, and insulator by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.1
- ✓ Let the learners do the presentation on conductor, semiconductor, and insulator and assess as per the rubric developed.
- ✓ Instruct learners to read INFORMATION SHEET 2.1 and perform OPERATION SHEET 2.1 and ask them to send the short video 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 2.1 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:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=0NBTvJF6ghQ&t=72s (Explanation on Conductor, Insulator, and semiconductor)

A. Competency/Competencies:

- ✓ Use instruments to note the readings in a circuit.

B. Learning objectives/Topic:

Learning objectives	Topic
2.2.1 Define instrument 2.2.2 List types of scale 2.2.3 List the types of electrical measuring instruments 2.2.4 State the functions of measuring instruments 2.2.5 List signs & symbols of instruments 2.2.6 Explain the errors in the instruments. 2.2.7 *Be responsible and vigilant while performing instrument reading* 2.2.8 *Ensure safe handling of instrument*	2.2: Performing instruments reading **Overview:** The learner can perform instruments reading besides knowing the types of scales, electrical sign and symbol, and functions of instruments.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.2
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://www.youtube.com/watch?v=gkeJzRrwe5k that explains the types of measuring instruments.
- ✓ Make learners perform OPERATION SHEET 2.2
- ✓ Let the learners discuss in the group and do a presentation on measuring instruments using PPT, handouts, demonstration, and short video clips to explain about measuring instruments.
- ✓ Instruct learners to read INFORMATION SHEET 2.2 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=6zAL4Rd_xMc that explains how to take ammeter reading and using the same concept ask learners to find voltmeter reading.
- ✓ Share the web links https://www.youtube.com/watch?v=gkeJzRrwe5k on different types of electrical instrument.
- ✓ Share the web links https://www.youtube.com/watch?v=TdUK6RPdIrA that explains how to use multi-meter.
- ✓ Share the web links https://www.youtube.com/watch?v=rPXD5n3bpWU explains how to use power factor meter.
- ✓ Let the learners discuss in the group and submit their response through google classroom or any other relevant social media.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Based on the information gathered. Let the learner list down the standard procedure to perform instrument reading.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.2 and perform OPERATION SHEET 2.2 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about measuring instrument by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.2
- ✓ Let the learners do a presentation on measuring instruments and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 2.2 and make notes on measuring instruments and ask them to send them as evidence through Google Classroom or any other relevant social media platforms. Assess them using rubrics.
- ✓ Let the student solve SAMPLE SELF CHECK 2.2 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 the rubric to assess their answer.

E. Resources:

- ✓ Textbook (CBLM for Class IX & X)
- ✓ Handout
- ✓ https://www.youtube.com/watch?v=rPXD5n3bpWU (Explanation on power factor meter)
- ✓ https://www.youtube.com/watch?v=TdUK6RPdIrA (Explanation on the use of Multimeter)
- ✓ https://www.youtube.com/watch?v=gkeJzRrwe5k (Videos on different types of electrical measuring instruments)
- ✓ https://www.youtube.com/watch?v=6zAL4Rd_xMc (Video on use of Ammeter)

A. Competency/Competencies:

- ✓ Calculate the resistance value when connected to load supply.

B. Learning objectives/Topic:

Learning objectives	Topic
2.3.1 Define resistance, resistor and resistivity (unit and symbol) 2.3.2 State the factors affecting resistance 2.3.3 List the types of resistors 2.3.4 List the application of resistors 2.3.5 Determine the value of resistors using colour coding chart 2.3.6 ***Use multimeter*** 2.3.7 *Ensure safe handling of measuring instruments* 2.3.8 *Ensure to select correct range of the meters*	2.3: Measure resistance **Overview:** The learners can measure resistance besides knowing its unit, symbol, resistor color coding, types and application of resistor**.**

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.3
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://www.youtube.com/watch?v=edxyBS6Tb1Y can be shared that explains the resistance value.
- ✓ Share a weblink https://www.youtube.com/watch?v=G2GvFPAddKU which explains how to read resistor color code.
- ✓ Make learners perform OPERATION SHEET 2.3
- ✓ Let the learners discuss in the group and do a presentation on Faraday's law of electromagnetic induction using PPT, handouts, demonstration, and short video clips to explain Faraday's law.
- ✓ Instruct learners to read INFORMATION SHEET 2.3 through Google Classroom.
- ✓ Share weblink https://www.youtube.com/watch?v=G2GvFPAddKU which explains how to read color code.

- ✓ Provide the web link https://www.youtube.com/watch?v=edxyBS6Tb1Y that explains the how to calculate the resistance value
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 2.3 through Google Classroom. (The learners may arrange available tools and materials at home)

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.3 and write short notes on Faraday's law of electromagnetic induction and assess learners using rubrics. Provide necessary intervention.
- ✓ Assess learner's knowledge about Faraday's law of electromagnetic induction by asking questions.
- ✓ Conduct class test to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.3
- ✓ Let the learners do a presentation on Faraday's law of electromagnetic induction and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 2.3 and make them write notes and ask them to send as evidence through Google Classroom or any other relevant social media platforms. Assess them using rubrics.
- ✓ Let the student solve SAMPLE SELF CHECK 2.3 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 the rubric to assess their answer.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=edxyBS6Tb1Y (Explans how to calculate resistance value)
- ✓ https://www.youtube.com/watch?v=G2GvFPAddKU (Explains how to read resistor color code)

A. Competency/Competencies:

- ✓ Measure voltage when the load is connected to the supply.

B. Learning objectives/Topic:

Learning objectives	Topic
2.4.1 Define voltage (unit and symbol) 2.4.2 State the difference between AC and DC source 2.4.3 List the types of voltmeter *2.4.4* ***Use voltmeter*** *2.4.6* ***Use multimeter*** *2.4.6 Ensure safe handling of measuring instruments.* *2.4.7 Ensure to select correct range of the meters.*	2.4: Measuring voltage **Overview:** Besides acquiring information on voltage unit, symbol, and differences between AC and DC, the learners can measure voltage.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.4
- ✓ Provide handouts to learners.
- ✓ Use ICT (PPT/PDF), handouts, demonstration and short video clips to explain how to measure resistance, voltage, current, power, frequency and energy.
- ✓ Make learners perform OPERATION SHEET 2.4
- ✓ Let the learners discuss in the group and do a presentation on Measuring resistance, voltage, current, power, frequency and energy using PPT, handouts, demonstration and short video clips to explain how to measure resistance, voltage, current, power, frequency and energy.
- ✓ Instruct learners to read INFORMATION SHEET 2.4 through Google Classroom.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to read OPERATION SHEET 2.4 through Google Classroom.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.4 and perform OPERATION SHEET 2.4 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about current, voltage, power, and frequency by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.4
- ✓ Make learners read INFORMATION SHEET 2.4 and ask them to make notes and 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 2.4 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:

- ✓ Textbook (CBLM of class IX)
- ✓ Handouts

A. Competency/Competencies:

- ✓ Measure current when the load is connected to the supply.

B. Learning objectives/Topic:

Learning objectives	Topic
2.5.1 Define Current (unit and symbol) 2.5.2 State types of current 2.5.3 Explain the effects of current 2.5.4 List the types of ammeter 2.5.5 ***Use Ammeter*** *2.5.6* ***Use clamp on multimeter*** *2.5.7 Ensure safe handling of measuring instruments* *2.5.8Ensure to select correct range of the meters*	2.5 Measure current **Overview:** The learners can acquire information on types of current, effects of current, types of ammeter and can also measure current.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.5
- ✓ Provide handouts to learners.
- ✓ Share web link https://www.youtube.com/watch?v=kQLNvGkxt_k which explains how to calculate electric current
- ✓ Make learners perform OPERATION SHEET 2.5
- ✓ Let the learners discuss in the group and do a presentation on measuring resistance, voltage, current, power, frequency and energy using PPT, handouts, demonstration and short video clips to explain how to measure resistance, voltage, current, power, frequency and energy.
- ✓ Instruct learners to read INFORMATION SHEET 2.5 through Google Classroom.
- ✓ Provide a weblink https://www.youtube.com/watch?v=kQLNvGkxt_k that explains how to measure current.
- ✓ Instruct learners to read OPERATION SHEET 2.5 through Google Classroom.
- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.5and perform OPERATION SHEET 2.5 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about current, voltage, power, and frequency by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.5
- ✓ Make learners read INFORMATION SHEET 2.5 and ask them to make notes and 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 2.5 and submit answers through google classroom or any other relevant social media.

E. Resources:

- ✓ Textbook (CBLM of class IX)
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=kQLNvGkxt_k (Explains how to measure current)

A. Competency/Competencies:

- ✓ Measure current when the load is connected to the supply.

B. Learning objectives/Topic:

Learning objectives	Topic
2.6.1 Define Power (unit and symbol) 2.6.2 State the relation between current, voltage and power 2.6.3 List the types of power 2.6.4 Explain power triangle 2.6.5 Define power factor *2.6.6* ***Use Wattmeter*** *2.6.7 Ensure safe handling of measuring instruments* *2.6.8 Ensure to select correct range of the meters*	2.6 Measure power **Overview:** The learners can measure power besides knowing about the relation between current, voltage and power.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.6
- ✓ Provide weblink https://www.electricaltechnology.org/2020/12/energy-power-consumption-kwh-calculator.html which explains how to calculate the energy and power consumed.
- ✓ Make learners perform OPERATION SHEET 2.6

- ✓ Instruct learners to read INFORMATION SHEET 2.6 through Google Classroom.
- ✓ Provide a web link https://www.electricaltechnology.org/2020/12/energy-power-consumption-kwh-calculator.html which explians how to calculate energy and power consumed.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.6 and perform OPERATION SHEET 2.6 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about current, voltage, power, and frequency by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.6
- ✓ Let the learners do a presentation on current, voltage, power, and frequency and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 2.6 and ask them to make notes and 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 2.6 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 the rubric to assess their answer.

E. Resources:

- ✓ Textbook (CBLM of class IX
- ✓ Handouts
- ✓ https://www.electricaltechnology.org/2020/12/energy-power-consumption-kwh-calculator.html (Explains how to calculate power and energy consumed)

A. Competency/Competencies:

- ✓ Measure the frequency when connected to the supply.

B. Learning objectives/Topic:

Learning objectives	Topic
2.7.1 Define frequency (unit and symbol) 2.7.2 State the relation between time and frequency 2.7.3 ***Use Frequency meter*** 2.7.4 *Ensure safe handling of measuring instruments*	2.7 Measure frequency **Overview:** The learners can measure frequency besides knowing its unit and symbol, and relation among time and frequency.

2.7.5 *Ensure to select correct range of the meters range of the meters*	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.7
- ✓ Provide handouts to learners.
- ✓ Share weblink https://www.electrical4u.net/electrical-basic/frequency-measure-frequency/ explains how to measure frequency.
- ✓ Make learners perform OPERATION SHEET 2.7
- ✓ Let the learners discuss in the group and do a presentation on Ohm's law using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 2.7 through Google Classroom.
- ✓ Provide weblink https://www.electrical4u.net/electrical-basic/frequency-measure-frequency/ that explains how to measure frequency.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.7 and perform OPERATION SHEET 2.7 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about Ohm's law by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.7
- ✓ Let the learners do a presentation on Ohm's law and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 2.7 and ask them to make notes and 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 2.7 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 the rubric to assess their answers.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.electrical4u.net/electrical-basic/frequency-measure-frequency/ (Explains how to measure frequency)

A. Competency/Competencies:

- ✓ Measure the frequency when connected to the supply.

B. Learning objectives/Topic:

Learning objectives	Topic
2.8.1 Define Electrical Energy (unit and symbol) 2.8.2 Calculate energy consumed 2.8.3 Calculate electricity tariff 2.8.4 List the types of electrical load *2.8.5* ***Use Energymeter*** *2.8.6 Ensure safe handling of measuring instruments* *2.8.7 Ensure to select correct range of the meters*	2.8 Measure energy **Overview:** The learners can measure energy besides knowing about its unit, symbol, types of electrical load and how to calculate the energy consumed and electricity tariff.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.8
- ✓ Provide handouts to learners.
- ✓ Share a weblink https://www.youtube.com/watch?v=xk6uViWjSNA which explains how to calculate energy consumed at home.
- ✓ Share weblink https://byjus.com/energy-consumption-formula/ question on how to calculate energy consumed.
- ✓ Make learners perform OPERATION SHEET 2.8
- ✓ Let the learners discuss in the group and do a presentation on Ohm's law using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 2.8 through Google Classroom.
- ✓ Share weblink https://www.youtube.com/watch?v=xk6uViWjSNA which explains how to calculate energy consumed at home.
- ✓ Provide web link https://byjus.com/energy-consumption-formula/ which explains how to calculate energy consumed.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.8 and perform OPERATION SHEET 2.8 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about Ohm's law by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.8
- ✓ Let the learners do a presentation on Ohm's law and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 2.8 and ask them to make notes and 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 2.7 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 the rubric to assess their answers.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=xk6uViWjSNA (Explains how to calculate energy consumed at home)
- ✓ https://byjus.com/energy-consumption-formula/ (calculation on energy consumed)

Chapter 3: Verifying DC circuits

A. Competency/Competencies:

- ✓ Verify ohm's law to find a relation among current, voltage, and resistance.

B. Learning objectives/Topic:

Learning objectives		Topic
3.1.1	State Ohm's law	3.1: Verifying Ohm's law **Overview:** The learners can verify Ohm's law besides knowing relation among voltage, current and resistance.
3.1.2	State the application of Ohm's law	
3.1.3	State the limitations of Ohm's law	
3.1.4	***Use ammeter***	
3.1.5	***Use voltmeter***	
3.1.6	*Ensure safe handling of meters*	
3.1.7	*Ensure to check the connection of meters*	
3.1.8	*Ensure to verify the circuit connection*	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 3.1
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://www.youtube.com/watch?v=wBjT7KZqVuM that explains the principle of Ohm's law.
- ✓ Make learners perform OPERATION SHEET 3.1
- ✓ Let the learners discuss in the group and do a presentation on Ohm's law using PPT, handouts, demonstration, and short video clips.

- ✓ Instruct learners to read INFORMATION SHEET 3.1 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=wBjT7KZqVuM that explains the principle of Ohm's law.
- ✓ Provide the web link https://www.youtube.com/watch?v=5FSnkZo1vEY that shows the relationship among resistance, current, voltage and Ohm's law.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 3.1 and perform OPERATION SHEET 3.1 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about Ohm's law by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.1
- ✓ Let the learners do a presentation on Ohm's law and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 3.1 and ask them to make notes and 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 3.1 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 answers.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=5FSnkZo1vEY (Explanation of relationship among I, V, R)
- ✓ https://www.youtube.com/watch?v=wBjT7KZqVuM (Explains the Ohm's law.)

A. Competency/Competencies:

- ✓ Verify characteristics of series of the circuit to determine that the total source voltage of the circuit is equal to the sum of individual voltage.

B. Learning objectives/Topic:

Learning objectives	Topic
3.2.1 Define series circuit. 3.2.2 Explain the characteristics of the series circuit. 3.2.3 Calculate the value of resistance and voltage in the series circuit. 3.2.4 Verify characteristics of the series circuit.	3.2 Verifying characteristics of series of circuit **Overview:** The learners can verify series circuit after knowing its

3.2.5 *Ensure correct position of the meter.* 3.2.6 *Ensure to select the proper range of the meter.* 3.2.7 *Ensure safe handling of meters.* 3.2.8 *Ensure to verify the circuit connection*	characteristics and application of series circuit.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 3.2
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=ZQurBlu35Fo that explains the connection of the series circuit.
- ✓ Share the web link https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ that explains how to calculate the value of the series circuit.
- ✓ Make learners perform OPERATION SHEET 3.2
- ✓ Let the learners discuss in the group the series circuit and do a presentation on a series connection using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 3.2 through Google Classroom.
- ✓ Share the web link https://www.youtube.com/watch?v=ZQurBlu35Fo that explains the connection of the series circuit
- ✓ Share the web link https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ that explains how to calculate the value of the series circuit.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to read OPERATION SHEET 3.2 through Google Classroom.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 3.2 and perform OPERATION SHEET 3.2 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about series circuits by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.2
- ✓ Let the learners do the presentation on the series circuit and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 3.2 and ask them to make notes and 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 3.2 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 the rubric to assess their answer.

- ✓ Make learners read INFORMATION SHEET 3.2 and make them write notes and ask them to send as evidence through Google Classroom or any other relevant social media platforms. assess them using rubrics

E. Eesources:

- ✓ CBLM
- ✓ https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ (Sample question on the series circuit)
- ✓ https://www.youtube.com/watch?v=ZQurBlu35Fo(Explanation on series)

A. Competency/Competencies:

- ✓ Verify characteristics of the parallel circuit to determine that the total circuit current is equal to the sum of individual current.

B. Learning objectives/Topic:

Learning objectives	Topic
3.3.1 Define parallel circuit 3.3.2 Explain the characteristics of parallel circuit 3.3.3 State the advantages and disadvantages of parallel circuit 3.3.4 List the applications of parallel circuit 3.3.5 ***Use ammeter*** 3.3.6 ***Use voltmeter*** 3.3.7 ***Interpret circuit diagram*** 3.3.8 *Ensure safe handling of instruments* 3.3.9 *Ensure to check the connection of meters* 3.3.10 *Ensure to verify the circuit connection.*	3.3 Verify characteristics of parallel circuit **Overview:** The learners can verify parallel circuit besides knowing its characteristics, application, advantages and disadvantages.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 3.3
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://www.youtube.com/watch?v=jNFXtjt5muI that explains the parallel circuit.
- ✓ Provide the web link https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ that explains the calculation on the parallel circuit.
- ✓ Make learners perform OPERATION SHEET 3.3
- ✓ Let the learners discuss in the group and do a presentation on the parallel circuit using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 3.3 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=jNFXtjt5muI that explains the about the parallel circuit.

- ✓ Provide the web link https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ that explains how to calculate resistance in the parallel circuit.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.
- ✓ Instruct learners to perform OPERATION SHEET 3.3through Google Classroom.
- ✓ Let the learners discuss in the group the parallel circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 3.3 and perform OPERATION SHEET 3.4 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about parallel circuits by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.3
- ✓ Let the learners do the presentation on the parallel circuit and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 3.3 and ask them to make notes and send as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
- ✓ Let the learners solve SAMPLE SELF CHECK 3..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 the rubric to assess their answer.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=jNFXtjt5muI (Video on characteristics of the parallel circuit)
- ✓ https://www.sanfoundry.com/basic-electrical-engineering-questions-answers-series-circuits-parallel-networks/ (Sample question on the parallel circuit)

A. Competency/Competencies:

- ✓ Verify characteristics of the series-parallel circuit to determine the total circuit current and voltage drop in the circuit.

B. Learning objectives/Topic:

Learning objectives	Topic
3.5.1 State the advantages and disadvantages of series parallel combined circuit 3.5.2 State the application of series parallel combined circuit 3.5.3 Differentiate between series and parallel circuit 3.5.4 ***Use ammeter***	3.4: Verifying characteristics of the series-parallel circuit. **Overview:** The learners can verify the series –

3.5.5 ***Use voltmeter*** 3.5.6 *Ensure safe handling of instruments* 3.5.7 *Ensure to check the connection of meter* 3.5.8 *Ensure to verify the circuit connection*	parallel circuit besides knowing the application, advantages and disadvantages of series-parallel circuit.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 3.5
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://www.youtube.com/watch?v=sbocWMTmPK8 that explains the difference between series and parallel circuit.
- ✓ Make learners perform OPERATION SHEET 3.5
- ✓ Let the learners discuss in the group and do a presentation on the series-parallel circuit using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 3.5 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=sbocWMTmPK8 that explains the difference between series and parallel circuits.
- ✓ 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 series- parallel circuit and submit their response through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 3.5 and perform OPERATION SHEET 3.5 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about series-parallel circuits by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.5
- ✓ Let the learners do the presentation on a series-parallel circuit and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 3.5 and ask them to make notes and 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 3.5 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:

- ✓ Textbook
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=sbocWMTmPK8 (Differences between series and parallel circuit)

A. Competency/Competencies:

- ✓ Use Kirchhoff's law to analyze and solve complex node.

B. Learning objectives/Topic:

Learning objectives	Topic
3.6.1 State Kirchhoff's current law. 3.6.2 Explain sign-convention in applying Kirchhoff's current law. 3.6.3 State the limitations of Kirchhoff's current law. 3.6.4 State applications of Kirchhoff's current law. *3.6.5* ***Use ammeter and voltmeter*** 3.6.6 *Ensure safe handling of instruments* 3.6.7 *Ensure to check the connection of meters* 3.6.8 *Ensure to verify the circuit connection*	3.6: Verifying Kirchhoff's law **Overview:** The learners can know about the Kirchhoff's current and voltage law, and how to verify Kirchhoff's Law using sign convention.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 3.6
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://en.ppt-online.org/245316can be shared that explains the principle of Kirchhoff's law.
- ✓ Provide the web link https://www.youtube.com/watch?v=3jZ6xCAMJj8 can be shared that explain the sign convention of Kirchhoff's law.
- ✓ Make learners perform OPERATION SHEET 3.6
- ✓ Let the learners discuss in the group and do a presentation on Kirchhoff's law using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 3.6 through Google Classroom.
- ✓ Provide the web link https://en.ppt-online.org/245316 that explains the principle of Kirchhoff's law.
- ✓ Provide the web link https://www.youtube.com/watch?v=3jZ6xCAMJj8 that explains the sign convention of Kirchhoff's law.
- ✓ 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 Kirchhoff's law and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 3.6 and perform OPERATION SHEET 3.6 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about Kirchhoff's law by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 3.6
- ✓ Let the learners do the presentation on Kirchhoff's law and assess as per the rubric developed.

- ✓ Make learners read INFORMATION SHEET 3.6 and ask them to make notes and 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 3.6 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 the rubric to assess their answer.

E. Resources:

- ✓ CBLM
- ✓ https://en.ppt-online.org/245316 (Explanation on Kirchhoff's law)
- ✓ https://www.youtube.com/watch?v=3jZ6xCAMJj8 (Explanation Of Sign Convention)

Chapter 4: Verifying AC circuits

A. Competency/Competencies:

- ✓ Determine characteristics of AC and DC in CRO.

B. Learning objectives/Topic:

Learning objectives	Topic
1.1.1 Explain the generation of electricity. 1.1.2 Explain characteristics of AC and DC. 1.1.3 List the advantages of AC over DC. 1.1.4 State the application of Cathode Ray Oscilloscope (CRO). 1.1.5 Explain the operation of CRO. **1.1.6 Use CRO.** 1.1.7 Verify characteristics of AC and DC. 1.1.8 *Ensure secure connections.* 1.1.9 *Ensure to select AC or DC mode while verifying the characteristics of AC and DC.* 1.1.10 *Ensure safe handling of CRO* 1.1.11 Verify characteristics of AC and DC	4.1 Verifying characteristics of AC and DC **Overview:** The learners can verify AC and DC besides knowing about generation, application and advantages of DC and AC.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 4.1
- ✓ Provide handouts to learners.
- ✓ Provide the web link https://www.youtube.com/watch?v=q8HmRLCgDAI that explains the principle of generation of electricity.
- ✓ Make learners perform OPERATION SHEET 4.1
- ✓ Let the learners discuss in the group and do a presentation on verifying AC and DC circuits using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 4.1 through Google Classroom.

- ✓ Provide the web link https://www.youtube.com/watch?v=q8HmRLCgDAI that explains the principle of generation of electricity.
- ✓ 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 generation of electricity and submit their response through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 4.1 and perform OPERATION SHEET 4.1 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about AC, DC, and CRO by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 4.1
- ✓ Let the learners do a presentation on verifying AC and DC circuits using CRO and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 4.1 and ask them to send the PPT on the generation of electricity as evidence through Google Classroom or any other relevant social media platforms. Assess them using the checklist/performance guide.
- ✓ Let the learners solve SAMPLE SELF CHECK 4.1 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:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=q8HmRLCgDA (Explanation on the generation of electricity)

A. Competency/Competencies:

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

B. Learning objectives/Topic:

Learning objectives	Topic
4.2.1 Define phase sequence. 4.2.2 List the advantages of polyphase over single phase. 4.2.3 State the purpose of checking phase sequence. 4.2.4 Check phase sequence of 3 phase supply. 4.2.5 *Ensure to check the phase sequence within 30 seconds.* 4.2.6 *Ensure to avoid the connection of phase sequence meter to three-phase supply more than 30 seconds.*	4.2: Checking phase sequence of 3 phase supply **Overview:** The learners can check phase sequence of three phase supply besides knowing the purpose, advantages of 3phase supply.

4.2.7 *Ensure safe handling of phase sequence meter.* 4.2.8 *Ensure to use appropriate PPE.*	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 4.2
- ✓ 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 4.2
- ✓ 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.
- ✓ Instruct learners to read INFORMATION SHEET 4.2 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:

- ✓ Make learners read INFORMATION SHEET 4.2 and perform OPERATION SHEET 4.2 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 4.2
- ✓ Let the learners do a presentation on the phase sequence of three-phase and assess as per the rubric developed.
- ✓ 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 a checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.2 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:

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

A. Competency/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.

B. Learning objectives/Topic:

Learning objectives		Topic
4.3.1	State the purpose of interconnection of three phase	4.3: Verifying the characteristics of balanced and unbalanced load in star connection **Overview:** The learners can know about the purpose of interconnection, differences between star and delta connection and verify the characteristics of balanced and unbalanced load.
4.3.2	Differentiate between star and delta connection	
4.3.3	Explain the characteristics of balanced star load	
4.3.4	Explain the characteristics of unbalanced star load in 3-wire and 4-wire supply system	
4.3.5	***Use multimeter***	
4.3.6	***Use clamp on meter***	
4.3.7	*Ensure safe handling of instruments*	
4.3.8	*Ensure to check the connection of meter*	
4.3.9	*Ensure to verify the circuit connection*	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 4.3
- ✓ 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 4.3
- ✓ 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.
- ✓ Instruct learners to read INFORMATION SHEET 4.3through 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:

- ✓ Make learners read INFORMATION SHEET 4.3 and perform OPERATION SHEET 4.3and 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 4.3
- ✓ Let the learners do a presentation on characteristics of balanced and unbalanced load in star connection and assess as per the rubric developed.
- ✓ 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 a checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.3 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:

- ✓ 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. Competency/Competencies:

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

B. Learning objectives/Topic:

	Learning objectives	Topic
4.4.1	State the advantages and disadvantages of delta connection	4.4: Verifying the characteristics of balanced delta load connection **Overview:** The learners can know about the advantages, disadvantages and application of the delta connected load besides being able to verify its characteristics.
4.4.2	Explain the characteristics of balanced delta load	
4.4.3	State the application of delta connected load	
4.4.4	***Use multimeter***	
4.4.5	***Use clamp on meter***	
4.4.6	*Ensure safe handling of instruments*	
4.4.7	*Ensure to check the connection of meters*	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 4.4
- ✓ Provide handouts to learners.
- ✓ Make learners perform OPERATION SHEET 4.4
- ✓ 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.
- ✓ Instruct learners to read INFORMATION SHEET 4.4 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:

- ✓ Make learners read INFORMATION SHEET 4.4 and perform OPERATION SHEET 4.4 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 4.4
- ✓ Let the learners do a presentation on characteristics of balanced delta load connection and assess as per the rubric developed.
- ✓ 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 a checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.4 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 the rubric to assess their answer.

E. Resources:

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

Class X

MODULE 1: Applying Fundamentals of Electricity

Chapter 1: Installing protective devices for single phase

A. Competency/Competencies:

- ✓ Install distribution board for single phase while doing house wiring.

B. Learning objectives/Topic:

Learning objectives	Topic
1.1.1 List types of distribution board 1.1.2 State the function of distribution board 1.1.3 Install distribution board for single phase 1.1.4 *Ensure secure connections.* 1.1.5 *Ensure to verify the circuit connection*	1.1 Installing distribution board for single phase **Overview:** The learners can acquire information on the types of DB, function of DB and can also install DB.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.1
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=TiEJYQYTz6U&t=59s that explains the wiring connection of DB for single phase.
- ✓ Make learners perform OPERATION SHEET 1.1
- ✓ Let the learners discuss in the group and do a presentation on distribution board for single phase using PPT, handouts, demonstration, and short video clips.
- ✓ Let the learners discuss in the group and submit their responses through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.1 and perform OPERATION SHEET 1.1 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 1.1
- ✓ Let the learners do a presentation on the resistive circuit and assess as per the rubric developed.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=TiEJYQYTz6U&t=59s (Explains the wiring connection for single phase DB)

A. Competency/Competencies:

- ✓ Install miniature circuit breaker for single phase.

B. Learning objectives/Topic:

Learning objectives	Topic
1.2.1 Define MCB 1.2.2 List the types of MCB 1.2.3 Explain the working principle of MCB 1.2.4 State the application of MCB 1.2.5 Select MCB as per requirement 1.2.6 Select wire size for the connection of single phase MCB 1.2.7 Select color coding for the connection of single phase MCB 1.2.8 *Ensure secure connections.* 1.2.9 *Ensure to verify the circuit connection.* 1.2.10 *Ensure to check the functionality of CRO and function generator*.	1.2 Installing miniature circuit breaker for single phase **Overview:** Besides knowing about the definition, working principle, types, color coding and application of MCB, the learners can acquire skills to install MCB for single phase.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.2
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=u_Mvu6RgEvQ that explains the installation and working of MCB.
- ✓ Make learners perform OPERATION SHEET 1.2
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.2 and perform OPERATION SHEET 1.2 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 1.2
- ✓ Let the learners do a presentation on the inductive circuit and assess as per the rubric developed.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=u_Mvu6RgEvQ (explains the working and instsallation of MCB)
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

A. Competency/Competencies:

- ✓ Install RCCB.

B. Learning objectives/Topic:

Learning objectives	Topic
1.3.1 Define RCCB 1.3.2 Explain working principle of RCCB 1.3.3 State the application of RCCB 1.3.4 Select RCCB as per requirement *1.3.5 Ensure secure connections.* *1..3.6 Ensure to verify the circuit connections*	1.3 Installing RCCB **Overview**: Besides knowing the function of a RCCB and its working principles, the learners can operate it safely.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.3
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=rdYkwC2JI6M&t=137s that explains the wiring connections of RCCB.
- ✓ Make learners perform OPERATION SHEET 1.3
- ✓ Provide the web link https://www.youtube.com/watch?v=rdYkwC2JI6M&t=137s that explains the wiring connection of RCCB.
- ✓ Provide handouts, self-made tutorial video clips, and PPT through Google Classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.3 and perform OPERATION SHEET 1.3 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 1.3
- ✓ Let the learners do the presentation on the capacitive circuit and assess as per the rubric developed.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=rdYkwC2JI6M&t=137s (explains the wiring connection of RCCB)
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha.

A. Competency/Competencies:

- ✓ Install ELCB for single phase.

B. Learning objectives/Topic:

Learning objectives	Topic
14.1 Define ELCB 1.4.2 Explain the working principle of ELCB 1.4.3 State the function of ELCB 1.4.4 State the importance of settting tripping current ***1.4.5 Set tripping current*** 1.4.6 ***Use multimeter*** *1.4.7 Ensure safe handling of instrument* *1.4.8 Ensure to verify the circuit connection*	1.4 Installing earth leakage circuit breaker for single phase **Overview:** Besides knowing the function of a ELCB and its working principles, the learners can operate it safely.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.4
- ✓ Make learners perform OPERATION SHEET 1.4
- ✓ Provide the web link https://www.youtube.com/watch?v=3IpozVxYW2M that explains the differences between ELCB and RCCB.
- ✓ Provide the weblink https://www.youtube.com/watch?v=ckl_KRqif14 that explains the wiring connection of ELCB.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 1.4 and perform OPERATION SHEET 1. 4 and assess them using the checklist/performance guide
- ✓ Assess learner's knowledge about ELCB and RCCB by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 1.4
- ✓ Let the learners do the presentation on the differences between and assess as per the rubric developed.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=3IpozVxYW2M (Explains the differences between ELCB and RCCB)
- ✓ https://www.youtube.com/watch?v=ckl_KRqif14 (wiring connection of ELCB)
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

A. Competency/Competencies:

- ✓ Install change over switch for single phase.

B. Learning objectives/Topic:

Learning objectives	Topic
1.5.1 Define changeover switch 1.5.2 List the types of changeover switch 1.5.3 State the application of changeover switch 1.5.4 Select changeover switch as per the current rating 1.5.5 ***Use drilling machine*** 1.5.6 ***Use multimeter*** 1.5.7 *Ensure safe handling of instruments* 1.5.8 *Ensure to verify the circuit connection*	1.5 Installing changeover switch for single phase **Overview:** The topic is about the changeover switch and it can enable the learners to select and install the changeover switch as per the current rating.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 1.5
- ✓ Provide handouts to learners.
- ✓ Share a link https://www.youtube.com/watch?v=11jjGiixmJw which explains the working of change over switch.
- ✓ Share the web link https://www.youtube.com/watch?v=EKdMzUl1-fc that explains the manual wiring connection for single phase.
- ✓ Provide the web link https://www.youtube.com/watch?v=7ngawiq5nXY that explains the automatic change over switch wiring connection for single phase.
- ✓ Make learners perform OPERATION SHEET 1.5
- ✓ Let the learners discuss in the group and do a presentation on the RC series circuit using PPT, handouts, demonstration, and short video clips.
- ✓ 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:

- ✓ Make learners read INFORMATION SHEET 1.5 and perform OPERATION SHEET 1.5 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 1.5
- ✓ Let the learners do the presentation on characteristics of RC series circuit and assess as per the rubric developed.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=11jjGiixmJw (explains the working of change over switch)
- ✓ https://www.youtube.com/watch?v=EKdMzUl1-fc (explains the wiring connection for manual change over switch)

- ✓ https://www.youtube.com/watch?v=7ngawiq5nXY (explains the wiring connection for automatic change over switch)
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

Chapter 2: Installing protective device for three phase

A. Competency/Competencies:

- ✓ Install MCB for three Phase

B. Learning objectives/Topic:

Learning objectives	Topic
2.2.1 Explain the working principle of three phase MCB 2.2.2 State the application of three phase MCB 2.2.3 Select three phase MCB as per requirement 2.2.4 Select wire size for the connection of three phase MCB 2.2.5 Select color coding for the connection of three phase MCB 2.2.6 Connect three Phase MCB 2.2.7 ***Use Multimeter*** 2.2.8 *Ensure safe handling of instrument* 2.2.9 *Ensure to verify the circuit connection*	2.1 Installing MCB for three phase **Overview:** The learners can install three phase besides knowing the application, color coding and wire size

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.1
- ✓ Provide handouts to learners.
- ✓ Make learners perform OPERATION SHEET 2.1
- ✓ Let the learners discuss in the group and do a presentation on the LC series circuit using PPT, handouts, demonstration, and short video clips.

D. Assessment:

- ✓ 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.

E. Resources:

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

A. Competency/Competencies:

- ✓ Install Bus bar.

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

Learning objectives	Topic
2.2.1 Define bus bar 2.2.2 Select bus bar 2.2.3 *Ensure secure connection.* 2.2.4 *Ensure to verify the circuit connection.*	2.2. Install bus bar **Overview:** The learners can install bus bar besides knowing the application, color coding and wire size.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.2
- ✓ Provide handouts to learners.
- ✓ Make learners perform OPERATION SHEET 2.2
- ✓ Let the learners discuss in the group and do a presentation on how to install bus bar using PPT, handouts, demonstration, and short video clips.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.2 and perform OPERATION SHEET 2.2 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about the Bus bar by asking questions.
- ✓ Conduct class test to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.2
- ✓ Let the learners do the presentation on characteristics of the Bus bar and assess as per the rubric developed.

E. Resources:

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

A. Competency/Competencies:

- ✓ Install Distribution board for three phase.

B. Learning objectives/Topic:

Learning objectives	Topic
2.3.1 List types of distribution board 2.3.2 State the function of distribution board 2.3.3 Install distribution board for three phase 2.3.4 *Ensure secure connections.* 2.3.5 *Ensure to verify the circuit connection*	2.3 Install distribution board for three phase Overview: The learners can install DB for three phase besides knowing its types and function.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.3
- ✓ Provide handouts to learners.

- ✓ Share the web link https://www.youtube.com/watch?v=cDpRLl5R-7s or https://www.youtube.com/watch?v=X6pkJHfZUoo that explains the characteristics of the RL parallel circuit.
- ✓ Make learners perform OPERATION SHEET 2.3
- ✓ Let the learners discuss in the group and do a presentation on RL parallel circuit using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 2.3 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=cDpRLl5R-7s or https://www.youtube.com/watch?v=X6pkJHfZUoo that explains the wiring connection of three phase Distribution board.
- ✓ 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 three phase distribution board and submit their response through google classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.3 and perform OPERATION SHEET 2.9 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 2.3
- ✓ Make learners read INFORMATION SHEET 2.3 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 2.3 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:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=cDpRLl5R-7s https://www.youtube.com/watch?v=X6pkJHfZUoo (Explains the wiring connection of three phase)

A. Competency/Competencies:

- ✓ Install Three phase RCCB.

B. Learning objectives/Topic:

Learning objectives	Topic

2.4.1 Select RCCB for Three phase load 2.4.1 State the advantages and limitations of RCCB ***2.4.1 Use multimeter*** 2.4.1 *Ensure safe handling of instruments* 2.4.1 *Ensure to verify the circuit connection*	2.4 Installing RCCB for three phase Overview: The learners can install a RCCB for three phase besides knowing the advantages and disadvantages of RCCB

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.4
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=llHYhdkA18k that explains the testing and connection of three phase RCCB.
- ✓ Make learners perform OPERATION SHEET 2.4
- ✓ 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.
- ✓ Instruct learners to read INFORMATION SHEET 2.4 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=llHYhdkA18k that explains the testing and wiring connection of three phase.
- ✓ 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:

- ✓ Make learners read INFORMATION SHEET 2.4 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 2.4
- ✓ Let the learners do the presentation on characteristics of RC parallel circuit and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 2.4 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 2.4 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:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=llHYhdkA18k (Explains the wiring connection of three phase)

A. Competency/Competencies:

- ✓ Install Three phase ELCB while doing commercial wiring.

B. Learning objectives/Topic:

Learning objectives	Topic
2.5.1 State the importance of setting tripping current 2.5.2 Select ELCB for three phase *2.5.3* ***Set tripping current*** *2.5.4* ***Use multimeter*** 2.5.5 *Ensure safe handling of instruments* 2.5.6 *Ensure to verify the circuit connection*	2.5 Installing ELCB for three phase **Overview:** The learners can install the three phase ELCB besides knowing the application and current rating of three phase ELCB.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.5
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=-ZnZit2tCyI&t=5s that explains the wiring connection of three phase ELCB with loads and supply.
- ✓ Make learners perform OPERATION SHEET 2.5
- ✓ Let the learners discuss in the group and do a presentation on LC parallel circuit using PPT, handouts, demonstration, and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 4.11 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=-ZnZit2tCyI&t=5s 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:

- ✓ 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.
- ✓ 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:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=-ZnZit2tCyI&t=5s (Explains the wiring connection of three phase ELCB)

A. Competency/Competencies:

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

B. Learning objectives/Topic:

Learning objectives	Topic
2.6.1 Define MCCB 2.6.2 State the function for MCCB 2.6.3 Select MCCB as per requirement 2.6.4 ***Use multimeter*** *2.6.5 Ensure safe handling of instruments* *2.6.6 Ensure to verify the circuit connection*	2.6 Install MCCB **Overview:** Besides knowing the definition of MCCB, its function, current rating and process to install MCCB, the learners can install MCCB.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.6
- ✓ Provide handouts to learners.
- ✓ Make learners perform OPERATION SHEET 2.6
- ✓ Let the learners discuss in the group and do a presentation on RLC parallel circuit using PPT, handouts, demonstration and short video clips.
- ✓ 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.
- ✓ Instruct learners to read INFORMATION SHEET 2.6 through Google Classroom.
- ✓ 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:

- ✓ Make learners read INFORMATION SHEET 2.6 and perform OPERATION SHEET 2.6 and assess them using the checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about MCCB by asking questions.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.6
- ✓ Make learners read INFORMATION SHEET 2.6 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 2.6 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 rubric to assess their answer.

E. Resources:

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

A. Competency/Competencies:

- ✓ Install change over switch for change over switch for three phase.

B. Learning objectives/Topic:

Learning objectives	Topic
2.7.1 Select current rating of changeover switch for three phase 2.7.2 ***Use multimeter*** 2.7.3 ***Use drilling machine*** *2.7.4 Ensure safe handling of instruments* *2.7.5 Ensure to verify the circuit connection*	2.7 Installing changeover switch for three phase **Overview:** The learners can install change over switch for three phase besides knowing its application and purposes**.**

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.7
- ✓ Provide handouts to learners.
- ✓ Provide web link https://www.youtube.com/watch?v=fwRF0X8_TQI&t=23s which explains the wiring connection of three phase change over switch.
- ✓ Share a link https://www.youtube.com/watch?v=hu_fftr7NJk which explains the wiring connection of automatic change over switch.
- ✓ Make learners perform OPERATION SHEET 2.6
- ✓ 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.
- ✓ Instruct learners to read INFORMATION SHEET 2.6 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 the phase sequence of three-phase and submit their response through Google Classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.6 and perform OPERATION SHEET 2.6 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.
- ✓ Make learners read INFORMATION SHEET 2.6 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 2.6 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:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=fwRF0X8_TQI&t=23s (Describes wiring connection of manual change over switch)
- ✓ https://www.youtube.com/watch?v=hu_fftr7NJk (Explains the automatic change over switch)

Chapter 3: Installing earthing

A. Competency/Competencies:

- ✓ Install Earthing in domestic wiring

B. Learning objectives/Topic:

Learning objectives	Topic
3.1.1 Introduce earthing 3.1.2 List the types of earthing 3.1.3 State the factors affecting soil resistivity 3.1.4 State the purpose of watering arrangement 3.1.5 State the purpose of using charcoal and salt 3.1.6 Explain the artificial treatment of soil 3.1.7 Select the size of earth lead 3.1.8 State the purpose of bonding earth electrode 3.1.9 ***Interpret drawing*** 3.1.10 ***Perform basic masonry work*** *3.1.11 Ensure efficient use of materials* *3.1.12 Ensure proper disposal of waste.*	3.1 Install plate earthing **Overview:** The learners can install plate earthing besides knowing the types, purpose and application of earthing.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.6
- ✓ Provide handouts to learners.
- ✓ Provide web link https://www.youtube.com/watch?v=Z4F8mterVGE which explains the earthing.
- ✓ Provide web link https://www.youtube.com/watch?v=vwjsMRF4Pgo which explains the process of plate earthing.
- ✓ Make learners perform OPERATION SHEET 2.6
- ✓ 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.

- ✓ Instruct learners to read INFORMATION SHEET 2.6 through Google Classroom.
- ✓ Provide handouts, self-made tutorial video clips and PPT through Google Classroom or any other relevant social media.

D. Assessment:

- ✓ Make learners read INFORMATION SHEET 2.6 and perform OPERATION SHEET 4.14 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Assess learner's knowledge about the earthing.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.6
- ✓ Make learners read INFORMATION SHEET 2.6 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 2.6 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:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=vwjsMRF4Pgo (Explains the process of plate earthing)

A. Competency/Competencies:

- ✓ Install the pipe earthing in domestic wiring.

B. Learning objectives/Topic:

	Learning objectives	Topic
3.2.1	List the advantages of pipe earthing	3.2 Install Pipe Earthing **Overview:** The learner can install pipe earthing besides knowing the advantages, disadvantages and application of pipe earthing.
3.2.2	List the application of pipe earthing	
3.2.3	***Interpret drawing***	
3.2.4	***Perform masonry work***	
3.2.5	*Ensure efficient use of materials*	
3.2.6	*Ensure proper disposal of waste*	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.6
- ✓ Provide handouts to learners.
- ✓ Provide web link https://www.youtube.com/watch?v=8PTNjw-hQIM which explains the process of pipe earthing
- ✓ Make learners perform OPERATION SHEET 2.6

- ✓ 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.
- ✓ Instruct learners to read INFORMATION SHEET 2.6 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:

- ✓ Make learners read INFORMATION SHEET 2.6 and perform OPERATION SHEET 2.6 and assess them using a checklist/performance guide. Provide necessary intervention.
- ✓ Conduct class tests to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.6
- ✓ Let the learners do a presentation on characteristics of balanced delta load connection and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 2.6 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 2.6 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:

- ✓ CBLM
- ✓ Handouts
- ✓ https://www.youtube.com/watch?v=8PTNjw-hQIM (Explains the process of pipe earthing)
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha

A. Competency/Competencies:

- ✓ Install slab earthing.

B. Learning objectives/Topic:

	Learning objectives	Topic
3.3.1	Define slab earthing	3.3 Installing slab earthing **Overview:** The learners can know about slab earthing, its application, advantages and importance. They can also carry out installation of slab earthing.
3.3.2	State the application of slab earthing	
3.3.3	List the advantages of slab earthing	
3.3.4	State the importance of neutral earthing system	
3.3.5	***Use welding machine***	
3.3.6	***Use spanner***	
3.3.7	*Ensure efficient use of materials*	
3.3.8	*Ensure proper disposal of waste*	

3.3.9 Ensure safe disposal of waste.	

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 2.6
- ✓ Provide handouts to learners.
- ✓ Make learners perform OPERATION SHEET 2.6
- ✓ Let the learners discuss in group and do presentation on process to install slab earthing.
- ✓ Instruct learners to read INFORMATION SHEET 2.6 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 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:

- ✓ Make learners read INFORMATION SHEET 2.6 and perform OPERATION SHEET 2.6 and assess them using checklist/performance guide. Provide necessary intervention.
- ✓ Conduct class test to assess their understanding.
- ✓ Let learners carry out activities of the SAMPLE SELF CHECK 2.6
- ✓ Make learners read INFORMATION SHEET 2.6 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 2.6 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:

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

A. Competency/Competencies:

- ✓ Install the lighting arrester as per the standards procedure.

B. Learning objectives/Topic:

Learning objectives	Topic
3.4.1 Define LA 3.4.2 List the types of building LA 3.4.3 State the application of building LA 3.4.4 ***Interpret drawing*** 3.4.5 ***Use drilling machine*** 3.4.6 ***Use IR tester*** 3.4.7 ***Use earth tester***	3.4 Installing lighting arrester **Overview:** After knowing about the definition of LA, its types and application, the learners can install it.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 3.4
- ✓ Provide handouts to learners.
- ✓ Provide web link https://www.youtube.com/watch?v=l7r2QszVqlg which explains the types of lighting arrestor.
- ✓ Provide web link https://www.youtube.com/watch?v=Lk2LQGiKrGE which explains the installation of lighting arrestor.
- ✓ Make learners perform OPERATION SHEET 3.4
- ✓ Let the learners discuss in group and do presentation on verify half wave rectifier using PPT, handouts, demonstration and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 3.4 through Google Classroom.
- ✓ Provide web link https://www.youtube.com/watch?v=l7r2QszVqlg which explains the types of lighting arrestor.
- ✓ Provide web link https://www.youtube.com/watch?v=Lk2LQGiKrGE which explains the installation of lighting arrestor.
- ✓ 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:

- ✓ Make learners read INFORMATION SHEET 3.4 and perform OPERATION SHEET 3.4 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 3.4
- ✓ Let the learners do presentation on half wave rectifier and assess as per the rubric developed.
- ✓ Make learners read INFORMATION SHEET 3.4 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 3.4 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:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=l7r2QszVqlg (describes the lighting arrestor)
- ✓ https://www.youtube.com/watch?v=Lk2LQGiKrGE (explains the installation of lighting arrestor)

Chapter 4: Applying Engineering drawing

A. Competency/Competencies:

- ✓ Layout the drawing sheet while doing engineering drawings

B. Learning objectives/Topic:

Learning objectives	Topic
4.1.1 State importance of drawing margin 4.1.2 List types and sizes of drawing sheet 4.1.3 State standard gap between margin and edge of the drawing sheet ***4.1.4 Use set square*** ***4.1.5 Use T scale*** 4.1.6 *Ensure clean and neatness of drawing*. 4.1.7 *Ensure proper handling of drawing instruments*	4.1 Laying out drawing sheet **Overview:** The learner can lay out the drawing sheet after knowing about its importance, types and sizes.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 4.1
- ✓ Share the web link https://youtu.be/FzMPAiW8O-s that explains the layout of the drawing sheet).
- ✓ Share web link https://www.youtube.com/watch?v=lO2OA9AlvWE that explains the use of set square.
- ✓ Share the link https://www.youtube.com/watch?v=8XdUIvro4v4 that explains how to use T square.
- ✓ Make learners perform OPERATION SHEET 4.1
- ✓ Demonstrate the layout of the drawing sheet according to OPERATION SHEET 4.1 and make learners do it in a group followed by individual practices.
- ✓ Instruct learners to read INFORMATION SHEET 4.1
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
- ✓ Make learners go through the web link https://youtu.be/FzMPAiW8O-s that explains the layout of drawing sheet).
- ✓ Share weblink https://www.youtube.com/watch?v=lO2OA9AlvWE that explains how to use set square.
- ✓ Share web link https://www.youtube.com/watch?v=8XdUIvro4v4 that explains how to use T square.
- ✓ The teacher makes a video of the layout of the drawing sheet and uploads it in Google Classroom or any other social media platform.

D. Assessment:

- ✓ Make learners design layout of the drawing sheet referring to OPERATION SHEET 4.1
- ✓ Assess the learner's conceptual understanding by letting the learners answer the SAMPLE SELF CHECK 4.1 .Based on the assessment, provide necessary intervention.
- ✓ Assess the learner's conceptual understanding by letting the learner's answer the SAMPLE SELF CHECK 4.1 and make learners submit through Google Classroom or any other social media platforms.

- ✓ Make learners perform OPERATION SHEET 4.1and submit/ upload the layout sheet through Google Classroom or any other social media platforms.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://youtu.be/FzMPAiW8O-s (Describe the layout of drawing sheet)
- ✓ https://www.youtube.com/watch?v=8XdUIvro4v4 (Explains how to use Tsquare)
- ✓ https://www.youtube.com/watch?v=lO2OA9AlvWE (Explains how to use Set square)

A. Competency/Competencies:

- ✓ Drawing title block in drawing sheet.

B. Learning objectives/Topic:

Learning objectives	Topic
4.2.1 Define title block 4.2.2 State the importance of title block 4.2.3 Explain formats of title block ***4.2.4 Use set square*** ***4.2.5 Use T scale*** *4.2.6 Ensure clean and neatness of drawing.* *4.2.7 Ensure proper handling of drawing instruments*	4.2 Drawing title block **Overview:** The learners can draw title block using T square besides knowing about its importance and formats.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 4.2
- ✓ Provide handouts to learners.
- ✓ Share the web link https://www.youtube.com/watch?v=S5xqPw-v3GI that explains the how to draw title block.
- ✓ Make learners perform OPERATION SHEET 4.2
- ✓ Let the learners discuss in the group and do a presentation on filter circuit using PPT, handouts, demonstration and short video clips.
- ✓ Instruct learners to read INFORMATION SHEET 4.2 through Google Classroom.
- ✓ Provide the web link https://www.youtube.com/watch?v=S5xqPw-v3GI 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:

- ✓ Make learners read INFORMATION SHEET 4.2 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 4.2
- ✓ Let the learners do presentation on filter circuit and assess as per the rubric developed.
- ✓ 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 checklist/performance guide.
- ✓ Let the student solve SAMPLE SELF CHECK 4.2 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:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=S5xqPw-v3GI (Explains how to draw title block)

A. Competency/Competencies:

- ✓ Draw single stroke lettering as per the scale given.

B. Learning objectives/Topic:

Learning objectives	Topic
4.3.1 Define lettering 4.3.2 Define single stroke lettering 4.3.3 State the characteristics of type A and type B 4.3.4 State the purpose of drawing grid lines 4.3.5 List the types of pencil ***4.3.6 Use pencil*** ***4.3.7 Use set square*** ***4.3.8 Use T scale*** *4.3.9 Ensure clean and neatness of drawing.* *4.3.10 Ensure proper handling of drawing instruments* .	4.3 Drawing single stroke letter. **Overview:** Using the required technique the learner can draw single stroke letter.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 4.3
- ✓ Provide handouts to learners.
- ✓ Share weblink https://www.youtube.com/watch?v=pfw4mXsVSCU that explains use of different types of pencil.
- ✓ Share the web link https://www.youtube.com/watch?v=Ftm2cIwtpSc that explains how to draw single stroke lettering.
- ✓ Make learners perform OPERATION SHEET 4.3

- ✓ 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.
- ✓ Instruct learners to read INFORMATION SHEET 4.3 through Google Classroom.
- ✓ Provide web link https://www.youtube.com/watch?v=pfw4mXsVSCU that explains the use of different pencil.
- ✓ Provide the web link https://www.youtube.com/watch?v=Ftm2cIwtpSc that explains how to draw single stroke lettering.
- ✓ 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:

- ✓ 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 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 4.3
- ✓ Let the learners do the presentation on characteristics of voltage regulator circuit and assess as per the rubric developed.
- ✓ 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 platforms. Use the rubric to assess their answer.

E. Resources:

- ✓ CBLM
- ✓ Handouts
- ✓ Basic Electrical Engineering by V.K. Metha and Rohit Metha
- ✓ https://www.youtube.com/watch?v=pfw4mXsVSCU (explains different types of pencile)
- ✓ https://www.youtube.com/watch?v=Ftm2cIwtpSc (Explains how to draw single stroke lettering)

A. Competencies :

- ✓ Draw different types of lines as per their application

B. Learning objectives/Topic:

Learning objectives	Topic
1 List the types of lines in engineering drawing 4.4.2 List the Application of lines ***4.4.3 Use set square*** ***4.4.4 Use T scale*** *4.4.5 Ensure clean and neatness of drawing.* *4.4.6 Ensure proper handling of drawing instruments*	4.4 Drawing lines **Overview**: The learner can know about different types of line and draw them.

C. Learning Experiences:

- ✓ Make learners read INFORMATION SHEET 4.4
- ✓ Make learners perform OPERATION SHEET 4.4
- ✓ The teacher asks learners to watch the following videos:
- ✓ Share the weblink https://youtu.be/SaOoKpLBfYo that explains the different types of lines.
- ✓ Share the weblink https://youtu.be/E6OXZ9OHpVk that explains the application of lines withdrawing.
- ✓ Provide web link https://youtu.be/SaOoKpLBfYo that explains the different types of lines.
- ✓ Share the weblink https://youtu.be/E6OXZ9OHpVk that explains the application of lines with drawing.
- ✓ The learner takes note of the different types of line and their application. Based on the information, the learner draws the symbols of different types of lines using a drawing instrument.
- ✓ The learner compares the different types of lines and explains their uses.

D. Assessment:

- ✓ Assess notes and drawing containing different types of lines using a rubric or a checklist. Provide necessary intervention based on the assessment
- ✓ Assess the work uploaded in the Google Classroom to assess learner's understanding of different types of lines. Provide necessary intervention following the assessment.

E. Resources (Online or offline)

- ✓ Competency-Based Learning Materials for Classes IX and X, REC
- ✓ https://youtu.be/SaOoKpLBfYo (Explanation on the different types of lines)
- ✓ https://youtu.be/E6OXZ9OHpVk (Explanation on the application of lines withdrawing)

A. Competency/Competencies:

- ✓ Provide dimensions as per the standard.

B. Learning objectives/Topic:

Learning objectives	Topic
4.5.1 List the rules of dimensioning 4.5.2 State the elements of dimensioning 4.5.3 State the methods of indicating dimensions 4.5.4 State the arrangement of dimensions 4.5.5 State dimensioning of geometrical shapes ***4.5.6 Use set square*** ***4.5.7 Use T scale*** ***4.5.8 Use Protractor*** *4.5.9 Ensure clean and neatness of drawing.* *4.5.10 Ensure proper handling of drawing instruments*	4.5 Dimensioning the objects **Overview:** The learners can carry out dimensioning after knowing about its types, system and rules.

C. Pedagogy/learning experience

- ✓ Make the learners read INFORMATION SHEET 4.5
- ✓ Make the learners go through OPERATION SHEET 4.5
- ✓ Share web link https://www.youtube.com/watch?v=y8EPc79ZJX0 which explains rules, methods, arrangement of dimensioning.
- ✓ Share the weblink https://youtu.be/XS0lJsmy-qg that explains the types of dimensioning and systems of dimensioning.
- ✓ Share web link https://www.youtube.com/watch?v=y8EPc79ZJX0 through Google Classroom that explains rules, arrangement and methods of dimensioning.
- ✓ Make learners go through the given web link https://youtu.be/XS0lJsmy-qg that explains the types of dimensioning and systems of dimensioning) and take notes.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET4.5
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.5 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://youtu.be/XS0lJsmy-qg (Explanation on the types of dimensioning and systems of dimensioning).

- ✓ https://www.youtube.com/watch?v=y8EPc79ZJX0 (Explains methods, arrangement and rules of dimensioning)

A. Learning objectives/Topic:

Learning objectives	Topic
4.6.1 Define triangle 4.6.2 List the types of triangle ***4.6.3 Use set square*** ***4.6.4 Use T scale*** ***4.6.5 Use compass*** *4.6.6 Ensure clean and neatness of drawing.* *4.6.7 Ensure proper handling of drawing instruments*	4.6 Drawing triangle **Overview:** The learner can draw triangle after knowing about its types.

B. Competency/Competencies:

- ✓ Draw triangle as per the standard.

C. Pedagogy/learning experience

- ✓ Make the learners read INFORMATION SHEET 4.6
- ✓ Make the learners go through OPERATION SHEET 4.6
- ✓ Share web link https://www.youtube.com/watch?v=GVZK5GWweKQ which explains rules, methods, arrangement of dimensioning.
- ✓ Make learners go through the given web link https://www.youtube.com/watch?v=GVZK5GWweKQ that explains the types of dimensioning and systems of dimensioning) and take notes.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.6
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.6 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=GVZK5GWweKQ (Explains how to draw triangle).

A. Competency/Competencies:

- ✓ Draw Cube as per the standard.

B. Learning objectives/Topic:

Learning objectives	Topic
4.7.1 Define cube ***4.7.2 Use set square*** ***4.7.3 Use T scale*** ***4.7.4 Use protractor*** *4.7.5 Ensure clean and neatness of drawing.* *4.7.6 Ensure proper handling of drawing instruments*	4.7 Drawing cube **Overview:** The learners can draw cube using different instruments.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.7
- ✓ Provide weblink https://www.youtube.com/watch?v=wsicpoiU0yk that explains how to draw isometric cube.
- ✓ Make the learners go through OPERATION SHEET 4.7
- ✓ Make the learners read INFORMATION SHEET 4.7
- ✓ Provide web link https://www.youtube.com/watch?v=wsicpoiU0yk that explains how to draw cube.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.7
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.7 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=wsicpoiU0yk (Explanation on how to draw cube)

A. Competency/Competencies:

- ✓ Draw octagon as per the methods of constructing octagon.

B. Learning objectives/Topic:

Learning objectives	Topic
4.8.1 Define octagon 4.8.2 State the methods of constructing octagon ***4.8.3 Use set square*** ***4.8.4 Use T scale*** ***4.8.5 Use compass*** *4.8.6 Ensure clean and neatness of drawing.* *4.8.7 Ensure proper handling of drawing instruments*	4.8 Drawing octagon **Overview:** The learner can draw octagon using methods of constructing Octagon.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.8
- ✓ Provide notes on how to draw cube.
- ✓ Make the learners go through OPERATION SHEET 4.8
- ✓ Share weblink https://www.youtube.com/watch?v=ikdv2_gfdiQ that explains how to construct the octagon using general methods.
- ✓ Make the learners read INFORMATION SHEET 4.8
- ✓ Share weblink https://www.youtube.com/watch?v=ikdv2_gfdiQ that explains how to construct the octagon using general methods through google classroom.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.8
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.8 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=ikdv2_gfdiQ (Explains how to construct the octagon using general methods).

A. Competency/Competencies:

- ✓ Draw ellipse as per the methods.

B. Learning objectives/Topic:

Learning objectives	Topic
4.9.1 Define ellipse 4.9.2 State the types of ellipse 4.9.3 Define eccentricity 4.9.4 Define focus 4.9.5 Define vertex 4.9.6 Define quadrant 4.9.7 State the methods of construction of ellipse ***4.9.8 Use set square*** ***4.9.9 Use T scale*** ***4.9.10 Use compass*** *4.9.11 Ensure clean and neatness of drawing.* *4.9.11 Ensure proper handling of drawing instruments*	4.9 Drawing ellipse **Overview:** The learner can draw ellipse using the methods to construction it.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide notes on how to draw ellipse.
- ✓ Share weblink https://www.youtube.com/watch?v=lRHtHS9q02o that explains how to draw ellipse.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Share weblink https://www.youtube.com/watch?v=lRHtHS9q02o through Google Classroom that explains how to draw ellipse.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.8
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.8 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=lRHtHS9q02o (Explains how to draw ellipse)

A. Competency/Competencies:

- ✓ Draw octagon as per the methods of constructing octagon.

B. Learning objectives/Topic:

Learning objectives	Topic
4.10.1 State the types of projection 4.10.2 State the application of projection 4.10.3 State the features of projection 4.10.4 Draw the symbol of orthographic projection ***4.10.5 Use set square*** ***4.10.6 Use T scale*** ***4.10.7 Use compass*** *4.10.8 Ensure clean and neatness of drawing.* *4.10.9 Ensure proper handling of drawing instruments*	4.10 Drawing front view of an object The learners can draw front view of an object besides knowing its types, application and features of projection.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide the weblink https://www.youtube.com/watch?v=lO8PhvaRKsI that explains procedure to draw front view of an object.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Share web link https://www.youtube.com/watch?v=lO8PhvaRKsI through Google Class room that explains the tips to draw front view of an object.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.9
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.9 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=lO8PhvaRKsI (Explains procedure to draw front view of an object)

A. Competency/Competencies:

- ✓ Draw orthographic top view of an object.

B. Learning objectives/Topic:

Learning objectives	Topic
4.11.1 State the types of projection 4.11.2 State the application of projection 4.11.3 State the features of projection 4.11.4 Draw the symbol of orthographic projection ***4.11.5 Use set square*** ***4.11.6 Use T scale*** ***4.1.7 Use compass*** ***4.11.8 Use mini drafter*** ***4.11.9 Use French curves*** ***4.11.10 Use divider*** *4.11.11 Ensure clean and neatness of drawing.* *4.11.12 Ensure proper handling of drawing instruments*	4.11 Drawing top view of an object **Overview:** The learner can draw top view of an object besides after knowing its types and application of projection.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide weblink https://www.youtube.com/watch?v=dZumY88UsLE that explains how to draw top view of an object.
- ✓ Provide weblink https://www.youtube.com/watch?v=lO8PhvaRKsI that explains how to tips to draw top view.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide web link https://www.youtube.com/watch?v=dZumY88UsLE through Google Classroom that explains how to draw top view of an object.
- ✓ Provide weblink https://www.youtube.com/watch?v=lO8PhvaRKsI that explains tips to draw top view of an object.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.9
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.9 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=dZumY88UsLE (Explains procedure to draw top view of an object)
- ✓ https://www.youtube.com/watch?v=lO8PhvaRKsI (Explains how to draw top view of an object)

A. Competency/Competencies:

- ✓ Draw right view of an object as per the standard.

B. Learning objectives/Topic:

Learning objectives	Topic
4.12.1 State the types of projection 4.12.2 State the application of projection 4.12.3 State the features of projection 4.12.4 Draw the symbol of orthographic projection ***4.12.5 Use set square*** ***4.12.6 Use T scale*** ***4.12.7 Use compass*** *4.12.8 Ensure clean and neatness of drawing.* *4.12.9 Ensure proper handling of drawing instruments*	4.12 Drawing right side view of an object **Overview:** The learner can draw right view of an object besides knowing its types, application, features of projection.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide web link https://www.youtube.com/watch?v=dZumY88UsLE that explains how to draw right view of an object.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9 through Google Classroom or other relevant social media.
- ✓ Share weblink https://www.youtube.com/watch?v=dZumY88UsLE that explains how to draw right view of an object through Google Classroom.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.9
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.9 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM

- ✓ https://www.youtube.com/watch?v=dZumY88UsLE (Explains how to draw right side view of an object)

A. Competency/Competencies:

- ✓ Draw left side view of an object as per standards.

B. Learning objectives/Topic:

Learning objectives	Topic
4.13.1 State the types of projection 4.13.2 State the application of projection 4.13.3 State the features of projection 4.13.4 Draw the symbol of orthographic projection ***4.13.5 Use set square*** ***4.13.6 Use T scale*** ***4.13.7 Use compass*** *4.13.8 Ensure clean and neatness of drawing.* *4.13.9 Ensure proper handling of drawing instruments*	4.13 Drawing left side view of an object **Overview:** The learner can draw left view of an object besides knowing its types, application, and features of projection.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide weblink https://www.youtube.com/watch?v=dZumY88UsLE that explains how to draw left view of an object.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9 though relevant social media.
- ✓ Share web link https://www.youtube.com/watch?v=dZumY88UsLE that explains how to draw left side view of an object.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.8
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.8 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=dZumY88UsLE (Explains how to draw left view of an object)

A. Competency/Competencies:

- ✓ Draw rear view of an object as per standards.

B. Learning objectives/Topic:

Learning objectives	Topic
4.14.1 State the types of projection 4.14.2 State the application of projection 4.14.3 State the features of projection 4.14.4 Draw the symbol of orthographic projection ***4.14.5 Use set square*** ***4.14.6 Use T scale*** ***4.14.7 Use compass*** *4.14.8 Ensure clean and neatness of drawing.* *4.14.9 Ensure proper handling of drawing instruments*	4.14 Drawing rear view of an object **Overview:** The learners can draw rear view of an object besides knowing its types, application, features of projection.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide notes on how to draw rear view of an object.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9through relevant social media.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.9
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.9 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM

A. Competency/Competencies:

- ✓ Draw isometric view as per the standards procedure.

B. Learning objectives/Topic:

Learning objectives	Topic
4.15.1 State axonometric projection 4.15.2 Explain principal of isometric projection 4.15.3 List the types of lines in an isometric projection 4.15.4 Explain dimensioning of isometric projection ***4.15.5 Use set square*** ***4.15.6 Use T scale*** ***4.15.7 Use compass*** ***4.15.8 Use mini drafter*** *4.15.8 Ensure clean and neatness of drawing.* *4.15.9 Ensure proper handling of drawing instruments*	4.15 Drawing isometric view **Overview:** The learners can draw isometric view besides knowing its principle, types of line and dimensioning of isometric view.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Share web link https://www.youtube.com/watch?v=c6DygJMwos8 that's explains how draw isometric view.
- ✓ Provide notes on how to draw isometric.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9 through relavant social media.
- ✓ Provide web link https://www.youtube.com/watch?v=c6DygJMwos8 that explains how to draw isometric view through Google Classroom.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.9
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.9 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM.
- ✓ https://www.youtube.com/watch?v=c6DygJMwos8 (Explains on the tips of drawing isometric view).

A. Competency/Competencies:

- ✓ Draw octagon as per the methods of constructing octagon.

B. Learning objectives/Topic:

Learning objectives	Topic
4.16.1 Define full sectioning 4.16.2 State the purpose of sectioning 4.16.3 List the types of cutting plane 4.16.4 List the rules of sectioning ***4.16.5 Use set square*** ***4.16.6 Use T scale*** ***4.16.7 Use mini drafter*** *4.16.8 Ensure clean and neatness of drawing.* *4.16.9 Ensure proper handling of drawing instruments*	4.16 Drawing full section of an object **Overview:** The learner can draw full section besides knowing its purpose, types of lines and rules of sectioning.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Share web link https://www.youtube.com/watch?v=x9XgBL0JugY explains the steps to draw full section view of an object.
- ✓ Share weblink https://www.youtube.com/watch?v=GhfkdpKwybw that explains the steps to draw full section of an object.
- ✓ Provide notes on how to draw full section of an object.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9 through relevant social media.
- ✓ Provide web link https://www.youtube.com/watch?v=x9XgBL0JugY that explains the procedure to draw full section view of an object.
- ✓ Provide the web link https://www.youtube.com/watch?v=GhfkdpKwybw that explains steps to draw full section view of an object through Google Classroom.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.9
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.9 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=x9XgBL0JugY (Explanation on steps to draw full section view of an object)

- ✓ https://www.youtube.com/watch?v=GhfkdpKwybw (explains procedure to draw full sectioning)

A. Competency/Competencies:

- ✓ Draw Half section as per the standards.

B. Learning objectives/Topic:

Learning objectives	Topic
44.17.1 Define half sectioning 4.17.2 State the difference between full section and half section ***4.17.3 Use set square*** ***4.17.4 Use T scale*** ***4.17.5 Use mini drafter*** *4.17.6 Ensure clean and neatness of drawing.* *4.17.7 Ensure proper handling of drawing instruments*	4.17 Drawing half section of an object **Overview:** The learner can draw section of an object besides after knowing the differences between full section and half section.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide notes on how to draw half section of an objects.
- ✓ Share web link https://www.youtube.com/watch?v=d6tGCVm9suY that explains steps to draw half section of an object.
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9 through relevant Social media.
- ✓ Provide web link https://www.youtube.com/watch?v=d6tGCVm9suY through google classroom that explains how steps to draw half section of an object.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.9
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.9 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM
- ✓ https://www.youtube.com/watch?v=d6tGCVm9suY (Explains the procedure to draw half section of an object)

A. Competency/Competencies:

- ✓ Draw octagon as per the standards

B. Learning objectives/Topic:

Learning objectives	Topic
4.18.1 Define partial sectioning 4.18.2 State the difference between half section and partial section ***4.18.3 Use set square*** ***4.18.4 Use T scale*** ***4.18.5 Use mini drafter*** *4.18.6 Ensure clean and neatness of drawing.* *4.18.7 Ensure proper handling of drawing instruments*	4.18 Drawing partial section of an object **Overview:** The learners can draw partial section of an object using various instruments.

C. Learning Experiences:

- ✓ Make the learners read INFORMATION SHEET 4.9
- ✓ Provide notes on how to draw partial section of an object
- ✓ Make the learners go through OPERATION SHEET 4.9
- ✓ Make the learners read INFORMATION SHEET 4.9 through relevant social media.

D. Assessment:

- ✓ Assess learner's ability to identify types of dimensions and the learner's conceptual understanding of systems of dimensioning. Provide necessary intervention if needed.
- ✓ Make learners perform OPERATION SHEET 4.9
- ✓ Assess the learner's conceptual understanding of dimensioning by assessing the answers to questions of SAMPLE SELF CHECK 4.9 uploaded in the Google Classroom. Provide necessary intervention following the assessment.
- ✓ Provide additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms

E. Resources:

- ✓ CBLM

Resources

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