

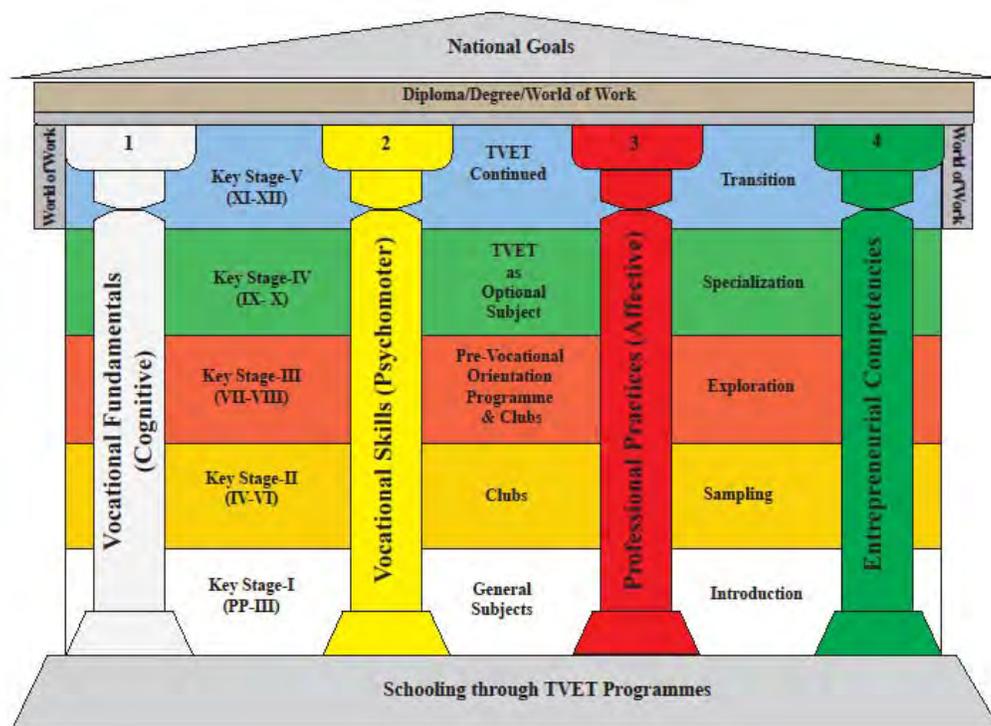
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET)

NEW NORMAL CURRICULUM

INSTRUCTIONAL GUIDE

(AUTOMOBILE)

CLASS: X



Royal Education Council

Paro: Bhutan

Published by:
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Royal Government of Bhutan
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Website: www.curriculum.bt

Provisional edition 2021

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ACKNOWLEDGEMENTS

The REC would like to acknowledge the assistance provided by the Ministry of Education (MoE), Royal Government of Bhutan in the development of Technical and Vocational Education and Training New Normal Curriculum Instructional Guide for classes IX - XII. The REC also extends its sincere gratitude to all the schools and individuals for their invaluable contributions towards the development of this instructional guide.

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FOREWORD

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

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

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

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

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

Kinga Dakpa,
Director General

INTRODUCTION

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

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

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

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

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

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MODULE: II: SERVICING BRAKE SYSTEM

Chapter 1: Overhauling Brake system

A. Learning objectives/ Broad theme/strand/Chapter/Topic:

Learning objectives	Core concept(Chapters/topics)
1.1.1 Define brake system. 1.1.2 Explain the function of the brake system. 1.1.3 State the types of brake systems. 1.1.4 Explain the principle of the brake system. 1.1.5 Explain the components of the brake system. 1.1.6 State the function of the brake booster. 1.1.7 Explain the types of the brake booster. 1.1.8 Check operation of the brake booster. 1.1.9 Check the operation of the brake booster.	1.1 Checking the operation of the brake booster.

B. Competencies:

- Determine the faulty brake booster and brake booster operation is checked as per the standard procedure for all types of vehicles.

C. Pedagogy/ Learning experience :

• Contact:

- ✓ Let them read the INFORMATION SHEET 1.1
- ✓ Read, demonstrate and give the guided practice on the OPERATION SHEET 1.1
- ✓ Make students do individual practice on OPERATION SHEET 1.1.
- ✓ Provide a short video clip on the operation of the brake booster.

• Non-contact:

- ✓ Let them read the INFORMATION SHEET 1.1
- ✓ Let them read on the OPERATION SHEET 1.1
- ✓ Provide the <https://carfromjapan.com/article/car-maintenance/brake-booster-works-braking-system/> (downloaded digital content, articles, etc.) that shows parts and functions of the brake booster.
- ✓ Provide the link https://www.youtube.com/watch?v=I4Ka4_ws1E to learn about brake booster and master cylinder work.
- ✓ Provide the link <https://www.youtube.com/watch?v=82qBBJ8iwcc> to learn how hydraulic brake systems work.
- ✓ Used zoom session to teach students.

D. Assessment:

• Contact:

- ✓ Let them write notes from the INFORMATION SHEET 1.1 and assess notes regularly.
- ✓ Let them perform OPERATION SHEET 1.1 and assess according to checklist/rubric.

- ✓ Assess learner’s information, comprehensiveness of practical, and ability to explain parts and functions of the brake system and brake booster as they perform the task using rubrics and checklist. Provide necessary intervention.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.1 that fulfills objectives and competency.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- ✓ Conduct class test, unit test and viva after completing topic.
- **Non-contact:**
 - ✓ Let learner to solve SAMPLE SELF CHECK 1.1 and submit answer through Google classroom, Wechat and other social media platform.
 - ✓ Give additional question using different sources through social media platform.
 - ✓ Let learner solve the question on case study and assess answer submitted in any possible social media platform.
 - ✓ Give online quiz on the topic, question and answer session through zoom meeting.

E. Resources (online and offline)

- ✓ CBLM, reference books, and other TLM, handouts
- ✓ https://www.youtube.com/watch?v=I4Ka4_ws1E (How to brake booster and master cylinder works)
- ✓ <https://www.youtube.com/watch?v=82qBBJ8iwcc> (How hydraulic brake system work).
- ✓ <https://carfromjapan.com/article/car-maintenance/brake-booster-works-braking-system/>(Shows parts and functions of brake booster).

A. Learning objectives/ topic

Learning objectives	Core concept(chapter/ topic)
1.2.1 Illustrate the construction of the vacuum brake booster. 1.2.2 Illustrate the construction of a hydraulic brake booster. 1.2.3 Explain the operation of the brake booster. 1.2.4 Change brake booster Notes: ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to handle brake fluid safely.</i>	1.2 Changing brake booster

B. Competencies:

- i. Install the brake booster components securely and braking effectiveness is improved after changing brake booster for any vehicle.

C. Pedagogy/ Learning experience :

- **Contact:**

- ✓ Let the learner read the INFORMATION SHEET 1.2
- ✓ Use PPT, handouts, and poster.
- ✓ Read, demonstrate and give the guided practice on the OPERATION SHEET 1.2
- ✓ Make students do individual practice on OPERATION SHEET 1.2.
- ✓ Provide a short video clip on the operation of the brake booster.

- **Non-contact:**

- ✓ Read the INFORMATION SHEET 1.2
- ✓ Upload PPT, handouts, and poster.
- ✓ Let learner read OPERATION SHEET 1.2
- ✓ Make students do individual practice on OPERATION SHEET 1.2.
- ✓ Based on the information from a link on Signs of Brake Booster is Bad or Failing Vacuum Leak (<https://www.youtube.com/watch?v=ZgzeM0KRY6A>) the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of brake booster using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Upload handouts & Demo++ PG through google classroom.
- ✓ Share link https://www.youtube.com/watch?v=_IIHgURXfLE with the learners to learn about how to brake booster and master cylinder work.
- ✓ Provide link <http://www.ijtre.com/images/scripts/2015030319.pdf> to learn about the construction of vacuum brake booster.
- ✓ Used zoom session to teach students.

D. Assessment:

- **Contact:**

- ✓ Assess learner's information, comprehensiveness of practical, and ability to explain parts and functions of the brake system and brake booster as they perform the task using rubrics and checklist. Provide necessary intervention.
- ✓ Make learner read and perform OPERATION SHEET 1.2
- ✓ Let's a learner solve SAMPLE SELF CHECK 1.2 and assess regularly.
- ✓ Assess the learner's notes and assignments frequently.
- ✓ Assess the ability of the learner when the effectiveness of braking performance is diminished and the following components are damaged (Booster diaphragm) and change as per the standard procedures.

- **Non-contact:**

- ✓ Use a rubric to assess the learner's conceptual understanding of the parts and functions of a brake system and brake booster based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner's achievement derived using the rubric and submit through the social media platform.

- ✓ Let make the learner solve SAMPLE SELF CHECK 1.2 and submit through Google classroom, Wechat, and other social media platform.
- ✓ Give additional question using different sources through a social media platform
- ✓ Give online quiz on the topic, question & answer session through zoom meeting.
- ✓ Let the learner write and submit notes through google classroom based on their understanding.

E. Resources (online and offline):

- ✓ CBLM, reference books, and other TLM such as poster, PPT, etc.
- ✓ <https://www.youtube.com/watch?v=IIHgURXfLE> (How to brake booster and master cylinder work).
- ✓ <http://www.ijtre.com/images/scripts/2015030319.pdf> (Construction of vacuum brake booster)
- ✓ <https://www.youtube.com/watch?v=ZgzeM0KRY6A> (Signs of bad brake booster or failing vacuum leak)

A. Learning objectives/topic

Learning objectives	Core concept(chapters/ topic)
1.3.1 State the function of the master cylinder. 1.3.2 Explain the types of master cylinders. 1.3.3 Illustrate the construction of the master cylinder. 1.3.4 Explain the operation of the master cylinder. 1.3.5 Replace master cylinder kits Notes: ✓ <i>Ensure to dispose of drained brake fluid in a safe container.</i> ✓ <i>Ensure safe handling of brake fluid.</i> ✓ <i>Ensure to use hand gloves and goggles.</i>	1.3 Replacing master cylinder kits

B. Competencies:

- i. Replaced defective master cylinder kits as per the standard procedures for any vehicle.

C. Pedagogy/ Learning experience :

- **Contact:**
 - ✓ Let them read the INFORMATION SHEET 1.3
 - ✓ Read, demonstrate and give the guided practice on OPERATION SHEET 1.3
 - ✓ Make students do individual practice on OPERATION SHEET 1.3.
 - ✓ Provide a short video clip on the operation of master cylinder kits.
 - ✓ Use PPT, handouts, and poster.
- **Non-contact**
 - ✓ Let them read the INFORMATION SHEET 1.3
 - ✓ Let them read on OPERATION SHEET 1.3

- ✓ Based on the information, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of brake booster using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Provide the (downloaded digital content, articles, etc.) that shows parts and functions of the brake booster.
- ✓ Provide web link to learn about brake booster & master cylinder working process https://www.youtube.com/watch?v=I4Ka4_ws1E .
- ✓ Share the link <https://www.youtube.com/watch?v=82qBBJ8iwcc> through google classroom to learn how hydraulic brake systems work.
- ✓ Used zoom session to teach students.

D. Assessment:

- **Contact:**

- ✓ Ask learners to perform OPERATION SHEET 1.3 and assess according to the rubric.
- ✓ Assess the learners' ability to identify the different types of brake shoes and their uses.
- ✓ Assess learner's information, comprehensiveness of practical, and ability to explain parts and functions of the brake system and brake booster as they perform the task using rubrics and checklist. Provide necessary intervention.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.3 that fulfills objectives and competency.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

- **Non-contact:**

- ✓ Let learner read and write notes on INFORMATION SHEET 1.3, assess according to the rubric.
- ✓ Use a rubric to assess the learner's conceptual understanding of the parts and functions of a brake system and brake booster after going through OPERATION SHEET 1.3 based on the vocal narratives and comprehensiveness of the demo++.
- ✓ Make learner solve SAMPLE SELF CHECK 1.3 and submit through Google classroom, Wechat, and other social media platforms.
- ✓ Give additional questions using different sources through the social media platform.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.
- ✓ Let learners solve questions on the case study and assess answers submitted in google classroom.

E. Resources (online and offline):

- ✓ CBLM, reference books, and other TLM

- ✓ <https://www.youtube.com/watch?v=I4Ka4ws1E> (Brake booster & master cylinder working process)
- ✓ <https://www.youtube.com/watch?v=82qBBJ8iwcc> (How hydraulic brake system works.)

A. Learning objectives/topic

Learning objectives	Core concept(chapters/topic)
1.4.1 Explain the types of brake shoes. 1.4.2 Explain the construction of the drum brake. 1.4.3 Explain the operation of a drum brake. 1.4.4 Change brake shoes Notes: <ul style="list-style-type: none"> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to use a safety stand and wedge the vehicle.</i> ✓ <i>Ensure to place removed tire under the vehicle.</i> 	1.4 Changing brake shoes

B. Competencies:

- i. Replace the defective brake shoes per the service manual for any vehicle.

C. Pedagogy/Learning Experiences

• **Contact:**

- ✓ Let learners read on INFORMATION SHEET 1.4
- ✓ Let learner read and perform on OPERATION SHEET 1.4
- ✓ Provide PPT, handouts, and poster
- ✓ Share the weblink <https://www.youtube.com/watch?v=P6g7ypIvAf8> with the learners which explain how to change brake shoes.

• **Non-contact:**

- ✓ Let learners read on INFORMATION SHEET 1.4
- ✓ Let learners go through OPERATION SHEET 1.4
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
- ✓ Provide the web link https://www.youtube.com/watch?v=bMg_j5_AGMg that shows how to brake system work.

D. Assessment:

• **Contact:**

- ✓ Make learners perform OPERATION SHEET 1.4 assess according to rubric/checklist submitted through the social media platform.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.4 that fulfills objectives and competency.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- ✓ Conduct unit test, class test, and viva completing after topic.
- ✓ Assess learner's notes and assignments regularly.

- **Non-contact:**
 - ✓ Make learners go through OPERATION SHEET 1.4 and send the short video clip based on their understanding as evidence through Google Classroom or any other social media platforms.
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.4 that fulfills objectives and competency and send answers through Google Classroom or any other social media platforms.
 - ✓ Give additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms.
 - ✓ Give a case study and submit an answer in any possible social media.

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for Classes IX and X, REC
- ✓ Hand-outs
- ✓ <https://www.youtube.com/watch?v=P6g7ypIvAf8> (How to change brake shoe).
- ✓ https://www.youtube.com/watch?v=bMg_j5_AGMg (How brake system works)

A. Learning objectives/topic

Learning objectives	Core concept(chapters/topic)
1.5.1 Define wheel cylinder. 1.5.2 State function of the wheel cylinder. 1.5.3 Explain the types of wheel cylinders. 1.5.4 Illustrate the construction of the wheel cylinder. 1.5.5 Explain the operation of the wheel cylinder. 1.5.6 Replaced wheel cylinder kits Notes: <ul style="list-style-type: none"> ✓ <i>Ensure to wedge the wheels.</i> ✓ <i>Ensure not to spill brake fluid over the vehicle body.</i> 	1.5 Replacing wheel cylinder kits

B. Competencies:

- i. Replace the damaged wheel cylinder kits and brake bleeding is performed as per the standard procedures for any vehicle.

C. Pedagogy/Learning experiences:

• **Contact:**

- ✓ Let learner read the INFORMATION SHEET 1.5
- ✓ Let learner read and perform on OPERATION SHEET 1.5.
- ✓ Provide posters, pictures, and PPT.
- ✓ Provide a short video clip on the operation of the wheel cylinder.

• **Non-contact:**

- ✓ Let learners read the INFORMATION SHEET 1.5

- ✓ Let learners go through OPERATION SHEET 1.5.
- ✓ Provide posters, pictures, and PPT.
- ✓ Provide the web link <https://www.youtube.com/watch?v=GIWYkCOPAQ0> (How to replace a wheel cylinder).
- ✓ Provide the link handouts, ppt, and poster through google classroom or any other social media platform.
- ✓ Upload hand-outs and pictures through Google classroom, Wechat, etc.

D. Assessment:

• **Contact:**

- ✓ Assess the learner's ability to identify parts and their function.
- ✓ Assess the learner's ability after practical on OPERATION SHEET 1.5 according to the rubrics developed.
- ✓ Let learners solve the SAMPLE SELF CHECK 1.5 and assess regularly.
- ✓ Conduct unit tests and class tests.
- ✓ Let learners do a presentation and assess according to criteria developed.

• **Non-contact:**

- ✓ Let learners solve the SAMPLE SELF CHECK 1.5 and submit answers through Google classroom, etc.
- ✓ Let the learners go through the links provided and assess the notes submitted through Google classroom or any other social media platform.
- ✓ Upload a question through possible social media platforms from the provided videos, hand-outs, CBLM, and assess their answers.
- ✓ Let learners solve questions on the case study and assess the answer submitted through google classroom.

E. Resources (online and offline):

- ✓ CBLM, REC, handouts, PPT, and posters.
- ✓ <https://www.youtube.com/watch?v=GIWYkCOPAQ0> (How to replace a wheel cylinder)

A. Learning objectives/topic

Learning objectives	Core concept(chapter/topic)
1.6.1 Explain the types of the brake caliper. 1.6.2 Illustrate the construction of the brake caliper. 1.6.3 Explain the operation of the brake caliper. 1.6.4 State functions of brake pad and its wear indicator. 1.6.5 Describe the materials of the brake pad. 1.6.6 Change brake caliper assembly	1.6 Changing brake caliper assembly

Notes:

- ✓ *Ensure safe handling of brake pipe while disconnecting.*
- ✓ *Ensure safe handling of brake fluid.*
- ✓ *Ensure appropriate use of PPE.*

B. Competencies:

- i. Change the defective brake caliper assembly as per the standard procedures and braking performance is effective for any automotive vehicle.

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

- ✓ Let the learner read the INFORMATION SHEET 1.6
- ✓ Let learner read and perform OPERATION SHEET 1.6
- ✓ Provide PPT, Handouts, and short video clip.

• Non-contact:

- ✓ Let the learner read the INFORMATION SHEET 1.6
- ✓ Let the learner read the OPERATION SHEET 1.6
- ✓ Provide link <https://www.youtube.com/watch?v=vxUTGxC15nU> to learn about how to diagnose a Seized Caliper Piston.
- ✓ Provide link <https://www.youtube.com/watch?v=vyc25Yxw7Ec> to learn how to replace brake caliper.
- ✓ Provide handouts and short video clips through the social media platform.

D. Assessment:**• Contact:**

- ✓ Provide all the tools and materials, let learners perform OPERATION SHEET 1.6 and assess according to rubric/checklist.
- ✓ After completing the practical, assess the end product using rubrics.
- ✓ Let them solve SAMPLE SELF CHECK 1.6
- ✓ Conduct unit tests, class tests, and viva after completing the topic.
- ✓ Assess learner's notes and assignments frequently.
- ✓ Give additional questions and assess their understanding of the topic.

• Non-contact:

- ✓ Let them solve SAMPLE SELF CHECK 1.6 and submit answers through google classroom.
- ✓ Assess the given question and answers submitted through Google classroom and other social media platforms.
- ✓ Give case study and submit answer through the social media platform.

E. Resources (online and offline):

- ✓ CBLM of classes IX-X
- ✓ PPT and handouts
- ✓ <https://www.youtube.com/watch?v=vxUTGxC15nU> (How to diagnose a seized caliper piston).

- ✓ <https://www.youtube.com/watch?v=vyc25Yxw7Ec> (How to replace brake caliper).

A. Learning objectives/topic

Learning objectives	Core concept(chapters/topic)
1.7.1 State the function of the brake pipeline. 1.7.2 Describe brake pipe layout. 1.7.3 Explain the types of brake pipes. 1.7.4 Use a flaring tool. 1.7.5 Replace brake pipeline Notes: ✓ Ensure to engage the parking brake. ✓ Ensure to handle brake safely. ✓ Ensure appropriate use of PPE.	1.7 Replacing brake pipeline

B. Competencies:

- i. Change the damaged brake pipe as per the standard procedures and brake system is operating effectively (improved) for any vehicle.

C. Pedagogy/Learning experiences:

• **Contact:**

- ✓ Let learners read the INFORMATION SHEET 1.7
- ✓ Use ppt, handouts, and short video clip.
- ✓ Let learners read and perform OPERATION SHEET 1.7
- ✓ Let learners read and perform SKILL SHEET 1.7

• **Non-contact:**

- ✓ Let learners read the INFORMATION SHEET 1.7
- ✓ Let learners go through OPERATION SHEET 1.7
- ✓ Let learners read SKILL SHEET 1.7
- ✓ Provide link <https://www.youtube.com/watch?v=yGNljntB0IM> to learn about how to replace brake pipeline/hose.
- ✓ Provide link https://www.youtube.com/watch?v=0E_w8_-Q_kU to learn about how to change brake line hose.
- ✓ Upload handouts and short video clips through social media.

D. Assessment:

• **Contact:**

- ✓ Provide all the tools and materials and let the learners perform the OPERATION SHEET 1.7.
- ✓ Let learners solve SAMPLE SELF CHECK 1.7
- ✓ After completing the practical, assess the end product using rubrics.
- ✓ Asses the Lerner notes and assignments frequently.
- ✓ Assess learner ability as per the required standard.

- ✓ Give assignment/ presentation topic and assess according to criteria developed.
- **Non-contact:**
 - ✓ Let learners solve SAMPLE SELF CHECK 1.7 and submit answers through Google classroom.
 - ✓ Assess the given question and answers submitted through Google classroom, Wechat, etc.
 - ✓ Give additional questions and let the learner submit answers through the social media platform.

E. Resources (online and offline):

- ✓ CBLM of classes IX-X
- ✓ <https://www.youtube.com/watch?v=yGNljntB0IM> (How to replace brake pipeline/hose).
- ✓ https://www.youtube.com/watch?v=0E_w8_-Q_kU (How to change brake line hose).

A. Learning objectives/topic

Learning objectives	Core concept (chapter/topic)
1.8.1 State function of brake disc/rotor. 1.8.2 State the types of brake disc/rotor. 1.8.3 Explain the defects of the brake disc/rotor. 1.8.4 Use micrometer. 1.8.5 Change brake disc/ rotor Notes: ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to support the vehicle with a safety stand.</i>	1.8 Changing brake disc/rotor

B. Competences

- i. Replace the rotor disc run out and thickness is inspected and change as per standard practices for any vehicle.

C. Pedagogy

- **Contact :**
 - ✓ Conduct pre-assessment on defects of brake disc/rotor & types of the brake disc (Let student use <https://www.youtube.com/watch?v=MAuVDB-G-HQ>)
 - ✓ Let learners read the INFORMATION SHEET 1.8
 - ✓ Let learner read and perform OPERATION SHEET 1.8
 - ✓ Demonstrate using OPERATION SHEET 1.8.
 - ✓ Provide PPT, handouts, and poster.
- **Non-contact**
 - ✓ Let learners read the INFORMATION SHEET 1.8
 - ✓ Let learner go through OPERATION SHEET 1.8

- ✓ Prepare short video lessons to introduce types of brake disc/rotor and share through a learning management system (Google classroom) or social media.
- ✓ The weblink (<https://www.youtube.com/watch?v=bGKJOICWmFQ>) can be shared with the students as it is easy to understand how to brake disc/rotor work.
- ✓ Upload ppt, handouts, and poster in google classroom.

D. Assessment:

• **Contact:**

- ✓ Assess learner's information, comprehensiveness of practical, and ability to explain parts and functions of brake disc/rotor as they perform the task using rubrics and checklist. Provide necessary intervention.
- ✓ Make learner read and perform OPERATION SHEET1.8
- ✓ Let's a learner solve SAMPLE SELF CHECK 1.8
- ✓ Assess the learner's notes, assignment frequently.
- ✓ Assess the ability of the learner when the effectiveness of braking performance is diminished and the following components are damaged (Brake rotor) and change as per the standard procedures.

• **Non-contact:**

- ✓ Use a rubric to assess the learner's conceptual understanding of the parts and functions of a brake system and brake disc/rotor based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner's achievement derived using the rubric and submit through the social media platform.
- ✓ Give additional questions using different sources through the social media platform.
- ✓ Let make the learner solve SAMPLE SELF CHECK 1.8 and submit through Google classroom, Wechat, and other social media platform.
- ✓ Give online quiz on the topic, question & answer session through zoom meeting.
- ✓ Let the learner write and submit notes through the google classroom based on their understanding.
- ✓ Let the learner solve the questions on the case study and assess answers submitted through google classroom.

E. Resources (online and offline):

- ✓ CBLM, reference books, and other TLM such as poster, PPT, etc.
- ✓ <https://www.youtube.com/watch?v=MAuVDB-G-HQ>(Defects of brake disc/rotor &types of brake disc).
- ✓ <https://www.youtube.com/watch?v=bGKJOICWmFQ> (How brake disc/rotor works)

✓ **Learning objectives/topic**

Learning objectives	Core concept(chapter/topic)
1.9.1 State the purpose of changing brake fluid. 1.9.2 State the function of brake fluid. 1.9.3 Explain the types of brake fluid. 1.9.4 List the properties of brake fluid. 1.9.5 State the purpose of brake bleeding. 1.9.6 Explain the changing intervals of brake fluid. 1.9.7 Change brake fluid Notes: 1.9.8 <i>Ensure appropriate use of PPE.</i> 1.9.9 <i>Ensure safe handling of brake fluid.</i>	1.9 Changing brake fluid

✓ **Competencies:**

- i. Change the contaminated or aged brake fluid and perform brake bleeding as per the standard procedures for any vehicle.

✓ **Pedagogy/Learning Experiences**

• **Contact:**

- ✓ Let learners read INFORMATION SHEET 1.9
- ✓ Let learner read and perform OPERATION SHEET 1.9
- ✓ Provide web link <https://www.youtube.com/watch?v=T05HSYDL8-Q> can be shared with the learners which explain how to change brake fluid.
- ✓ Use PPT, handouts, and poster.

• **Non-contact:**

- ✓ Let learners read INFORMATION SHEET 1.9
- ✓ Let learner read OPERATION SHEET 1.9
- ✓ Provide web link <https://www.youtube.com/watch?v=T05HSYDL8-Q> to the learners which explain how to change brake fluid.
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
- ✓ Provide the web link https://www.penriteoil.com.au/assets/tech_pdfs_new/Nov2015/Brake_Fluids.pdf that explains about the brake fluid.

✓ **Assessment:**

• **Contact:**

- ✓ Make learners perform OPERATION SHEET 1.9 and assess according to rubrics /checklist.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.9 that fulfills objectives and competency.

- ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- **Non-contact:**
 - ✓ Make learners go through OPERATION SHEET 1.9 and send the short video clip based on their understanding as evidence through Google Classroom or any other social media platforms.
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.9 that fulfills objectives & competency and send answers through Google Classroom or any other social media platforms.
 - ✓ Give additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms.
- ✓ **Resources (online and offline):**
 - ✓ Competency-Based Learning Materials for Classes IX and X, REC
 - ✓ Hand-outs
 - ✓ https://www.penriteoil.com.au/assets/tech_pdfs_new/Nov2015/Brake_Fluids.pdf (Explanation on the brake fluid).
 - ✓ <https://www.youtube.com/watch?v=T05HSYDL8-Q> (How to change brake fluid)

A. Learning objectives/topic

Learning objectives	Core concept(chapter/topic)
1.10.1 Define ABS system. 1.10.2 List the components of ABS. 1.10.3 State the function of speed sensor. 1.10.4 Explain the operation of ABS system. 1.10.5 Change anti- lock brake system speed sensor Notes: ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure that sensor wire is routed as previously to avoid crimping or twisting the wire harness.</i>	1.10 Changing anti-lock brake system speed sensor

B. Competencies:

- i. Replace the defective ABS wheel sensor and sensor wire connector is connected as per the standard procedures for any vehicle.

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ Let learners read INFORMATION SHEET 1.10
 - ✓ Let them read and perform OPERATION SHEET 1.10
 - ✓ Use PPT, handouts, demonstration, and short video clips.
 - ✓ The weblink <https://www.youtube.com/watch?v=LcuAsf3GZOA> can be shared with the learner how to replace a broken ABS wheel sensor inside a steering knuckle.

- **Non-contact:**
 - ✓ Let learners read INFORMATION SHEET 1.10
 - ✓ Let them read OPERATION SHEET 1.10
 - ✓ Use PPT, handouts, demonstration, and short video clips.
 - ✓ Provide hand-outs to learners through Google Classroom or any other social media platforms.
 - ✓ Upload handouts, video clips, and posters.
 - ✓ Provide the web link <https://www.youtube.com/watch?v=98DXe3uKwfc> that explains to understand ABS.
- D. Assessment:**
 - **Contact:**
 - ✓ Make learners perform OPERATION SHEET 1.10
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.10 that fulfills objectives and competency.
 - ✓ Give additional questions from CBLM and other resources-Google/YouTube.
 - ✓ Assess learner's note and assignment frequently.
 - ✓ Let learners do a presentation and assess accordingly.
 - **Non-contact:**
 - ✓ Make learners perform OPERATION SHEET 1.10 and send the short video as evidence through Google Classroom or any other social media platforms.
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.10 that fulfills objectives & competency and send answers through Google Classroom or any other social media platforms.
 - ✓ Give additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms.
 - ✓ Let learners solve questions on the case study and assess answers submitted through google classroom.
- E. Resources (online and offline):**
 - ✓ Competency-Based Learning Materials for Classes IX and X, REC
 - ✓ Hand-outs
 - ✓ <https://www.youtube.com/watch?v=LcuAsf3GZOA>(How to replace a broken ABS wheel sensor inside a steering knuckle)
 - ✓ <https://www.youtube.com/watch?v=98DXe3uKwfc> (Explanation on ABS).

A. Learning objectives/topic

Learning objectives	Core concept(chapter/ topic)
1.11.1 State the function of the hand brake cable. 1.11.2 List the types of the hand brake. 1.11.3 Explain the operation of the hand brake.	1.11 Changing parking brake cable

<p>1.11.4 Ensure proper disposal of old brake cable.</p> <p>1.11.5 Change parking brake cable</p> <p>Notes:</p> <ul style="list-style-type: none"> ✓ <i>Ensure to use appropriate PPE.</i> 	
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B. Competencies:

- i. Replace the broken hand brake cable connections and adjusted as per standard procedures for any vehicle.

C. Pedagogy/Learning Experiences

• **Contact:**

- ✓ Let learners read INFORMATION SHEET 1.11
- ✓ Demonstrate the technique to change the hand brake cable as per the standard procedures.
- ✓ Let them read and perform OPERATION SHEET 1.11
- ✓ Let the learner practice in a group and followed by individual practice according to rubrics provided.
- ✓ Share the weblink <https://www.youtube.com/watch?v=prwAtIDcsVE> with the learners How to Replace and Adjust Parking Brake Cables.
- ✓ Provide online content articles or handouts.

• **Non-contact:**

- ✓ Let learners read INFORMATION SHEET 1.11
- ✓ Let them go through OPERATION SHEET 1.11
- ✓ Provide handouts to learners through Google Classroom or any other social media platforms.
- ✓ Provide the web link <https://www.youtube.com/watch?v=h6ej2BoAmvA> that explains the operation of the hand brake.
- ✓ Provide online content articles or handouts.
- ✓ Using the information from the video, let the learners take notes on the Change parking brake cable

D. Assessment:

• **Contact:**

- ✓ Make learners perform OPERATION SHEET 1.11 and assess according to rubrics.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.11
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

• **Non-contact:**

- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.11 that fulfills objectives and competency and send answers through Google Classroom or any other social media platforms.

- ✓ Give additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms.
- ✓ Let learners solve the questions on the case study and assess answers submitted in google classroom

E. Resources (online and offline):

- ✓ Competency-Based Learning Materials for Classes IX and X, REC
- ✓ Hand-outs
- ✓ <https://www.youtube.com/watch?v=prwAtIDcsVE> (How to replace and adjust Parking Brake Cables).
- ✓ <https://www.youtube.com/watch?v=h6ej2BoAmvA> (Explanation on the operation of hand brake).

Chapter 2: Adjusting brake system

A. Learning objectives/ Broad theme/strand/Chapter/Topic:

Learning objectives	Core concept(Chapter/topic)
2.1.1 Define pedal-free play. 2.1.2 State the importance of brake pedal-free play. 2.1.3 State the purpose of brake pedal-free play. 2.1.4 Define pedal height. 2.1.5 State the purpose of pedal height. 2.1.6 Define reserve distance. 2.1.7 State the purpose of reserve distance. 2.1.8 Adjust brake pedal free play Notes: ✓ <i>Ensure to engage the parking brake</i> ✓ <i>Ensure appropriate use of PPE</i>	2.1 Adjusting brake pedal free play

B. Competencies

- i. Fit the disconnected brake pedal and adjust brake free play to the specification as per the service manual for any vehicle.

C. Pedagogy/ Learning experience :

• **Contact:**

- ✓ Let learners read the INFORMATION SHEET 2.1.
- ✓ Read, demonstrate and give the guided practice on the OPERATION SHEET 2.1
- ✓ Make students do individual practice on OPERATION SHEET2.1.
- ✓ Provide a short video clip on brake pedal-free play.
- ✓ Use PPT, handouts, and poster.

• **Non-contact:**

- ✓ Let learners read the INFORMATION SHEET 2.1.
- ✓ Make students go through OPERATION SHEET2.1.

- ✓ Based on the information from CBLM, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of brake free play using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Provide link <https://www.youtube.com/watch?v=jF0MZJE0eSM> to learn about brake pedal height inspection.
- ✓ Provide link <https://www.youtube.com/watch?v=rqyNjkWYZUs> to learn how to adjust brake lever free play.
- ✓ Used zoom session to teach students.

D. Assessment:

- **Contact:**

- ✓ Let learners perform OPERATION SHEET 1.11 and assess according to rubric/checklist.
- ✓ Assess learner's information, comprehensiveness of practical, and ability to explain parts and functions of the brake system and brake booster as they perform the task using rubrics and checklist. Provide necessary intervention.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 2.1 that fulfills objectives and competency.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- ✓ Asses by conducting the class tests, unit tests, and case studies.

- **Non-contact:**

- ✓ Use a rubric to assess the learner's conceptual understanding of the parts and functions of adjusting brake pedal free play based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner's achievement derived using the rubric and submit through the social media platform.
- ✓ Give additional questions using different sources through the social media platform.
- ✓ Let make the learner solve SAMPLE SELF CHECK 2.1 and submit through Google classroom, Wechat, and other social media platform.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.
- ✓ Give case study and research type question and asses through the social media platform.

E. Resources (online and offline):

- ✓ CBLM, NNC, and handouts.
- ✓ <https://www.youtube.com/watch?v=jF0MZJE0eSM> (How to inspect the brake pedal height).
- ✓ <https://www.youtube.com/watch?v=rqyNjkWYZUs>(How to adjust brake lever free play).

A. Learning objectives/ topic

Learning Objectives	Core concept(chapter/topic)
2.2.1 Explain the types of drum brake adjuster. 2.2.2 List the purpose of brake adjustment. 2.2.2 Adjust drum brake Notes: ✓ <i>Ensure to wedge the wheels.</i> ✓ <i>Ensure appropriate use of PPE.</i>	2.2 Adjusting drum brake

B. Competencies

- i. Rectify the ineffective drum brake is adjusted to specification as per the service manual for any vehicle.

C. Pedagogy/ Learning experience :

• Contact:

- ✓ Let learners read the INFORMATION SHEET 2.2.
- ✓ Read, demonstrate and give the guided practice on the OPERATION SHEET 2.2
- ✓ Make students do individual practice on OPERATION SHEET 2.2.
- ✓ Provide PPT, handouts, and poster
- ✓ Provide a short video clip on the operation of the drum brake.

• Non-contact:

- ✓ Share the link <https://www.youtube.com/watch?v=bnc3VnQ8kUY> with the learner (Downloaded digital content, articles, etc.) that shows parts and functions of the drum brake.
- ✓ Let learners read the INFORMATION SHEET 2.2
- ✓ Let learner go through OPERATION SHEET 2.2
- ✓ Provide the link <https://www.youtube.com/watch?v=ApuBEn2zct8> to learn about how drum brakes work in cars and light vehicles.
- ✓ Provide the link <https://www.youtube.com/watch?v=lUnLEGuW1HQ> to learn how to drum brake system work.
- ✓ Used zoom session to teach students.

D. Assessment:

• Contact:

- ✓ Assess learner's information, comprehensiveness of practical, and ability to explain parts and functions of the brake system and brake booster as they perform the task using a rubrics and checklist. Provide necessary intervention.
- ✓ Based on the information from INFORMATION SHEET 2.2, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of brake booster using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 2.2 that fulfills objectives and competency.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- ✓ Assess notes and assignment regularly.

- **Non-contact:**

- ✓ Use a rubric to assess the learner’s conceptual understanding of the parts and functions of a Drum brake system and adjusting the drum brake based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner’s achievement derived using the rubric and submit through the social media platform.
- ✓ Give additional questions using different sources through social media platforms.
- ✓ Let make the learner solve SAMPLE SELF CHECK 2.2 and submit through Google classroom, Wechat, and other social media platform.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.

E. Resources (online and offline):

- ✓ CBLM, reference books, and other TLM, handouts)
- ✓ <https://www.youtube.com/watch?v=bnc3VnQ8kUY>(Parts and functions of drum brake).
- ✓ <https://www.youtube.com/watch?v=ApuBEn2zct8>(How drum brakes work in cars and light vehicles).
- ✓ <https://www.youtube.com/watch?v=lUnLEGuW1HQ>(How to drum brake system work).

A. Learning Objectives/topic

Learning objectives	Core concept(chapter/topic)
2.3.1 List the symptoms, causes, and remedies of brake failure. 2.3.1 Perform test drive Notes: <ul style="list-style-type: none"> ✓ <i>Ensure to fasten the seat belt.</i> ✓ <i>Ensure to maintain the speed limit.</i> 	2.3 Performing Test Drive

B. Competencies

- Identify the faulty brake system symptoms for any vehicle.

C. Pedagogy/ Learning experience :

- **Contact:**

- ✓ Let learners read the INFORMATION SHEET 2.3.
- ✓ Used PPT, Handouts, and demonstrate.
- ✓ Read, demonstrate and give the guided practice on OPERATION SHEET 2.3
- ✓ Make students do individual practice on OPERATION SHEET 2.3.
- ✓ Provide a short video clip on symptoms, causes, and remedies of brake failure.

- **Non-contact:**

- ✓ Based on the information & knowledge gain from INFORMATION SHEET 2.3, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain symptoms, causes, and remedies of brake failure using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.

- ✓ Give handouts, PPT, and DEMO++PG through google classroom, Wechat, or any other social media.
- ✓ Provide the link <https://www.youtube.com/watch?v=1XJm5-sOyhY> to learn how to diagnose problems with brakes.
- ✓ Provide the link <https://motoroctane.com/advisor/206457-brake-problems> to learn about symptoms of brake system failures.
- ✓ Used zoom session to teach students.

D. Assessment:

- **Contact:**

- ✓ Let learners perform OPERATION SHEET 2.3 and assess according to rubric/checklist.
- ✓ Assess learner's information, comprehensiveness of practical, and ability to explain parts and functions of the brake system and brake booster as they perform the task using rubrics and checklist. Provide necessary intervention.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 2.3 that fulfills objectives and competency
- ✓ Let the learners do a presentation and asses as per the criteria developed.
- ✓ Conduct class tests, unit tests and give homework/classwork to assess the learner.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

- **Non-contact:**

- ✓ Use a rubric to assess the learner's conceptual understanding perform a test drive based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner's achievement derived using the rubric and submit through the social media platform.
- ✓ Give additional questions using different sources through the social media platform.
- ✓ Let learners solve SAMPLE SELF CHECK 2.3 and submit through Google classroom, Wechat, and other social media platforms.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.
- ✓ Let the learners write and submit a succinct note through any possible social media based on their understanding after watching videos.
- ✓ Give case study and submit answer through the possible social media platform.

E. Resources (online and offline):

- ✓ CBLM, reference books, and other TLM, hand-outs)
- ✓ <https://www.youtube.com/watch?v=1XJm5-sOyhY> (How to diagnose problems with brakes).
- ✓ <https://motoroctane.com/advisor/206457-brake-problems>(Symptom of brake system failures).

MODULE: II: SERVICING STEERING SYSTEM

Chapter 1: Servicing Steering Components

A. Learning objectives/ Broad theme/strand/Chapter/Topic:

Learning Objectives	Core Concept(Chapter/topic)
1.1.1 Define steering system. 1.1.2 State the functions of the steering system. 1.1.3 Explain the principles of the steering system. 1.1.4 Explain the types of the steering system. 1.1.5 Explain the components of the steering system. 1.1.6 List the types of steering gearbox. 1.1.7 Explain the basics of the SRS system. 1.1.8 State the advantages of the SRS system. 1.1.9 Replace steering wheel Notes: ✓ <i>Ensure to disconnect the battery negative terminal before removing the steering wheel.</i> ✓ <i>Ensure to tighten the wheel nut to the specified torque.</i> ✓ <i>Ensure to use appropriate PPE.</i>	1.1 Replacing steering wheel

B. Competencies

- i. Replace the Steering wheel in the correct position as per the standard procedures for any vehicle.

C. Pedagogy/ Learning experience :

- **Contact:**

- ✓ Let learners read the INFORMATION SHEET 1.1
- ✓ Use PPT, handouts, flip charts, and posters.
- ✓ Read, demonstrate and give the guided practice on OPERATION SHEET 1.1
- ✓ Make students do individual practice on OPERATION SHEET 1.1.
- ✓ Provide a short video clip on the principle of the steering wheel.

- **Non-contact:**

- ✓ Let learners read the INFORMATION SHEET 1.1
- ✓ Let learners go through OPERATION SHEET 1.1
- ✓ Based on the information/knowledge gain, make the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and principle using relevant digital tools & programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Provide the link <https://www.youtube.com/watch?v=em1O8mz7sF0> to learn about steering system.
- ✓ Give PPT, Handouts, and Posters through google classroom.
- ✓ Used zoom session to teach students.

D. Assessment:

• **Contact:**

- ✓ Let learners perform OPRRETION SHEET 1.1 and assess according to rubric/checklist.
- ✓ Assess learner’s information, comprehensiveness of practical, and ability to explain parts and functions of the brake system and brake booster as they perform the task using rubrics and checklist. Provide necessary intervention.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.1 that fulfills objectives and competency.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- ✓ Give assignment, classwork, homework, and presentation to assess learner according to criteria developed.
- ✓ Conduct unit tests, class tests, and case studies to asses’ learners understanding of the lesson.

• **Non-contact:**

- ✓ Use a rubric to assess the learner’s conceptual understanding of the parts and functions of a steering system and principles of a steering system based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner’s achievement derived using the rubric and submit through the social media platform.
- ✓ Give additional questions using different sources through the social media platform.
- ✓ Let make the learner solve SAMPLE SELF CHECK 1.1 and submit through Google classroom, Wechat, and other social media platform.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.
- ✓ Let the learners write &submit notes through google classroom.

E. Resources (online and offline):

- ✓ CBLM, reference books, and other TLM, handouts)
- ✓ <https://www.youtube.com/watch?v=em1O8mz7sF0> (Explanation on the steering system).

A. Learning objectives/topic

Learning objectives	Core concept(chapter/topic)
1.2.1 State the function of the steering shaft. 1.2.2 State the function of the universal joint. 1.2.3 State the function of the steering column. 1.2.4 Illustrate the construction of the steering column. 1.2.5 Replace steering shaft Notes: ✓ <i>Ensure to take care of electrical components</i> ✓ <i>Ensure to use appropriate PPE.</i>	1.2 Replacing steering shaft

B. Competencies

- i. Replace the Steering column without damaging other components and all electrical connections are connected as per the standard procedures for any type of vehicle.

C. Pedagogy/ Learning experience :

• Contact:

- ✓ Let Learners read the INFORMATION SHEET 1.2.
- ✓ Read, demonstrate and give the guided practice on OPERATION SHEET 1.2
- ✓ Make student to do individual practice on operation sheet 1.2.
- ✓ Provide short video clip on operation of steering shaft.
- ✓ Use PPT, handouts and poster through social media platform.

• Non-contact:

- ✓ Let learner read INFORMATION SHEET 1.2
- ✓ Based on the information from INFORMATION SHEET 1.2, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of steering shaft using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Provide the link <https://www.youtube.com/watch?v=EvoprDLubKw> to learn about how to change steering shaft.
- ✓ Provide the link https://www.youtube.com/watch?v=ypZ6Yv_N6h0 to learnt how to remove steering wheel COLUMN shaft.

D. Assessment:

• Contact:

- ✓ Let learners perform OPERATION SHEET 1.2 and assess according to rubric/checklist.
- ✓ Assess learner's information, comprehensiveness of practical, and ability to explain parts and functions of universal joints, steering shaft and steering column as they perform the task using a rubrics and checklist. Provide necessary intervention.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.2 that fulfils objectives and competency.
- ✓ Conduct unit test, class test and viva exam.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

• Non-contact:

- ✓ Use a rubric to assess learner's conceptual understanding of the parts and functions of universal joints, steering shaft and steering column based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner's achievement derived using the rubric and submit through social media platform.
- ✓ Give additional question using different sources through social media platform.
- ✓ Let make learner to solve SAMPLE SELF CHECK 1.2 and submit through Google classroom, Wechat and other social media platform.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.

- ✓ Give case study and submit answer through any possible social media platform.

E. Resources (online and offline):

- ✓ CBLM, reference books and other TLM, handouts)
- ✓ <https://www.youtube.com/watch?v=EvoprDLubKw>(How to change steering shaft)
- ✓ https://www.youtube.com/watch?v=ypZ6Yv_N6h0 (How to remove steering wheel COLUMN shaft).

A. Learning objectives/topic

Learning objectives	Core concept(chapter/topic)
1.3.1 State the function of tie rod end. 1.3.2 Explain the construction of tie rod end. 1.3.3 <i>Use tie rod end remover.</i> 1.3.4 Replace tie rod end Notes: <ul style="list-style-type: none"> ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure proper disposal of waste.</i> 	1.3 Replacing tie rod end

B. Competencies

- Replace the tie rod end as per the number of thread counted following standard procedures.

C. Pedagogy/ Learning experience :

• **Contact:**

- ✓ Learner should read the INFORMATION SHEET 1.3
- ✓ Use PPT, Handouts and poster.
- ✓ Read, demonstrate and give guided practice on the OPERATION SHEET 1.3
- ✓ Make student to do individual practice on OPERATION SHEET 1.3.
- ✓ Let learners read and perform SKILL SHEET 1.3
- ✓ Provide short video clip on operation of Tie-rod end.

• **Non-contact:**

- ✓ Let them read the INFORMATION SHEET 1.3
- ✓ Based on the information/ knowledge acquired from CBLM , the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions and construction of tie rod end using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Give PPT, handouts and poster through social media platform.
- ✓ Provide link <https://www.youtube.com/watch?v=8IJvb3tFjfc> to learn how to change tie rod end.
- ✓ Provide link <https://www.youtube.com/watch?v=7PMOkoJJswk> to learnt what is tie rod does and why it's important

D. Assessment:

• **Contact:**

- ✓ Assess learner’s information, comprehensiveness of practical, and ability to explain construction and functions of tie rod end as they perform the task using a rubrics and checklist. Provide necessary intervention.
- ✓ Conduct unit test, class test to assess the learners’ knowledge and skills.
- ✓ Let learner to read and perform SKILL SHEET 1.3: on using tie rod end remover.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.3 that fulfills objectives and competency.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

• **Non-contact:**

- ✓ Use a rubric to assess learner’s conceptual understanding of the parts and functions of and construction of tie rod end based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner’s achievement derived using the rubric and submit through social media platform.
- ✓ Give additional question using different sources through social media platform.
- ✓ Let make learner to solve SAMPLE SELF CHECK 1.3 and submit through Google classroom, Wechat and other social media platform.
- ✓ Give case study and submit through google classroom.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.

E. Resources (online and offline):

- ✓ CBLM, reference books and other TLM, handouts)
- ✓ <https://www.youtube.com/watch?v=7PMOkoJJswk> (Function of tie rod does and it’s importance)
- ✓ <https://www.youtube.com/watch?v=8lJvb3tFjfc> (How to change tie rod end).

A. Learning objectives/topic

Learning objectives		Co
1.4.1 State the function of rack and pinion. 1.4.2 Explain steering gear mechanism. 1.4.3 Calculate gear ratio. 1.4.4 List the components of rack and pinion. 1.4.5 Explain the operation of rack and pinion steering gear box. 1.4.6 Replace rack and pinion assembly Notes: ✓ <i>Ensure to use appropriate PPE.</i> ✓ <i>Ensure to jack up vehicle in correct position.</i>	1.4	1.5 Rep asse

B. Competencies

- i. Replace the rack and pinion gear box without damaging other components following service manual for any vehicle.

C. Pedagogy/ Learning experience :

- **Contact:**
 - ✓ Let Learner read the INFORMATION SHEET 1.4
 - ✓ Use PPT, handouts and poster.
 - ✓ Read, demonstrate and give guided practice on the OPERATION SHEET 1.4
 - ✓ Make student to do individual practice on OPERATION SHEET 1.4.
 - ✓ Provide short video clip on operation of rack and pinion.
- **Non-contact:**
 - ✓ Let learner read INFORMATION SHEET 1.4
 - ✓ Let learner go through OPERATION SHEET 1.4
 - ✓ Based on the information gathered, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of brake booster using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
 - ✓ Provide link <https://www.youtube.com/watch?v=NtZo4cDH3hk> to learn about rack and pinion how it works)
 - ✓ Provide link <https://www.youtube.com/watch?v=VgIkpPON5fk> to learn how rack and pinion steering gearbox mechanism works.
 - ✓ Provide PPT, handouts, case study and short video

D. Assessment:

- **Contact:**
 - ✓ Let learner perform OPERATION SHEET 1.4 and assess based on rubrics/checklist.
 - ✓ Assess learner's information, comprehensiveness of practical, and ability to explain functions of rack & pinion and operation of rack & pinion as they perform the task using a rubrics and checklist. Provide necessary intervention.
 - ✓ Conduct class test, unit test and viva theory test.
 - ✓ Assess learners' notes and assignment regularly.
 - ✓ Ask learners to solve the SAMPLE SELF CHECK 1.4 that fulfils objectives and competency
 - ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- **Non-contact:**
 - ✓ Let make learner to solve SAMPLE SELF CHECK 1.4 and submit answer through Google classroom, Wechat and other social media platform.
 - ✓ Use a rubric to assess learner's conceptual understanding of the parts and functions of rack & pinion, steering gear ratio based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner's achievement derived using the rubric and submit through social media platform.
 - ✓ Give case study and submit through google classroom.
 - ✓ Give additional question using different sources through social media platform.
 - ✓ Give online quiz on the topic, question and answer session through zoom meeting.

E. Resources (online and offline):

- ✓ CBLM, reference books and other TLM, handouts)

- ✓ <https://www.youtube.com/watch?v=NtZo4cDH3hk>(How rack and pinion steering works)
- ✓ <https://www.youtube.com/watch?v=VgIkpPON5fk> (How rack and pinion steering gearbox mechanism works).

A. Learning objectives/ topic

Learning objectives	Core concept(chapter/topic)
1.2.1 State the functions of pitman arm. 1.2.2 Replace pitman arm Notes: ✓ <i>Ensure appropriate use of PPE.</i> ✓ <i>Ensure to wedge the wheel.</i>	1.6 Replacing pitman arm

B. Competencies

- i. Align the pitman arm and sector shaft as per the alignment mark for any vehicle.

C. Pedagogy/ Learning experience :

• **Contact:**

- ✓ Let learner read the INFORMATION SHEET 1.5
- ✓ Read, demonstrate and give guided practice on the OPERATION SHEET 1.5: on replacing pitman arm.
- ✓ Use PPT, handouts and poster.
- ✓ Use animation to teach.
- ✓ Make student to do individual practice on OPERATION SHEET 1.5.
- ✓ Provide short video clip on operation of pitman arm.

• **Non-contact:**

- ✓ Let learner read the INFORMATION SHEET 1.5
- ✓ Let learner go through OPERATION SHEET 1.5
- ✓ Based on the information gathered, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of brake booster using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Provide link <https://www.youtube.com/watch?v=hENZiD7YSyg> to learn about how to Replace Pitman Arm.
- ✓ Provide link https://www.youtube.com/watch?v=u47F6ZMR0_g to learn signs of a bad pitman arm failing symptoms noise movement

D. Assessment:

• **Contact:**

- ✓ Let learner perform OPERATION 1.5 and assess according to rubrics/checklist
- ✓ Assess learner's information, comprehensiveness of practical, and ability to explain parts and functions pitman arm and replaced pitman arm as they perform the task using a rubrics and checklist. Provide necessary intervention.

- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.5 that fulfils objectives and competency.
- ✓ Conduct class test, unit test and viva session after completing every topic.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.
- **Non-contact:**
 - ✓ Use a rubric to assess learner's conceptual understanding on functions of pitman arm based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner's achievement derived using the rubric and submit through social media platform.
 - ✓ Give additional question using different sources through social media platform.
 - ✓ Let make learner to solve SAMPLE SELF CHECK 1.5 and submit through Google classroom, Wechat and other social media platform.
 - ✓ Give case study and submit through google classroom.
 - ✓ Give online quiz on the topic, question and answer session through zoom meeting.
- E. Resources (online and offline):**
 - ✓ CBLM, reference books and other TLM, handouts
 - ✓ <https://www.youtube.com/watch?v=hENZiD7YSyg> (How to replace pitman arm)
 - ✓ https://www.youtube.com/watch?v=u47F6ZMR0_g (Signs of a bad pitman arm failing symptoms noise movement).

A. Learning objectives/topic

Learning objectives	Core concept(chapter/topic)
1.2.1 Illustrate the construction of re-circulating type gear box. 1.2.2 Replace re-circulating ball type steering gear box Notes: <ul style="list-style-type: none"> ✓ <i>Ensure to wedge the wheel.</i> ✓ <i>Ensure to use appropriate PPE.</i> 	1.7 Replacing re-circulating ball type steering gear box

B. Competencies:

- i. Replace the re- circulating ball type steering gear box as per the standard procedures for any vehicle.

C. Pedagogy/Learning Experiences

- **Contact:**
 - ✓ The learners should read INFORMATION SHEET 1.6
 - ✓ Let learner read and perform OPERATION SHEET 1.6
 - ✓ Use PPT, handouts, poster and flip chart.
 - ✓ Use animation to teach.
 - ✓ Provide short video clip on operation and construction of re-circulating ball type steering gear box.
- **Non-contact:**
 - ✓ The learners should read INFORMATION SHEET 1.6

- ✓ Provide hand-outs to learners through Google Classroom or any other social media platforms.
- ✓ Provide web link <https://www.youtube.com/watch?v=LcuAsf3GZOA> with the learner how to replace a replace re-circulating ball type steering gear box.
- ✓ Based on the information gathered from CBLM, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of re- circulating ball steering gear box using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.

D. Assessment:

• **Contact:**

- ✓ Make learners to perform OPERATION SHEET 1.6
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.6 that fulfills objectives and competency.
- ✓ Conduct unit test, class test and viva exam after completing topic.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

• **Non-contact:**

- ✓ Make learners to perform OPERATION SHEET 1.6 and send the short video as evidence through Google Classroom or any other social media platforms.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.6 that fulfils objectives and competency from CBLM and send answers through Google Classroom or any other social media platforms.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube and let learners submit answers through Google Classroom or any other social media platforms.
- ✓ Give case study and submit through possible social media platform.

E. Resources (online and offline):

- ✓ Competency Based Learning Materials of X, REC
- ✓ Hand-outs
- ✓ <https://www.youtube.com/watch?v=LcuAsf3GZOA> (How to replace a replace re-circulating ball type steering gear box).

A. Learning objectives/topic

Learning Objectives	Core concept (chapter/topic)
1.2.1 Explain the operation of recirculating gear box. 1.2.2 Overhaul re- circulating type steering gear box Notes: ✓ <i>Ensure to wedge the wheel.</i> ✓ <i>Ensure to use appropriate PPE.</i>	1.8 Overhauling re-circulating type steering gear box

B. Competencies

- i. Overhaul the recirculating ball steering system is carried out following service manual for all the vehicle.

C. Pedagogy/ Learning experience :

- **Contact:**

- ✓ Learner should read the INFORMATION SHEET 1.7.
- ✓ Read, demonstrate and give guided practice on the OPERATION SHEET 1.7
- ✓ Use PPT, handouts and poster.
- ✓ Use animation to teach.
- ✓ Provide short video clip on overhauling recirculating –ball steering gear box.

- **Non-contact:**

- ✓ Let learner should read the INFORMATION SHEET 1.7.
- ✓ Read, demonstrate and give guided practice on the OPERATION SHEET 1.7
- ✓ Based on the information gathered, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of brake booster using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Provide the link <https://www.youtube.com/watch?v=qD00DIGVhtk> to learn about working of recirculating type steering gearbox
- ✓ Used zoom session to teach students.

D. Assessment:

- **Contact:**

- ✓ Assess learner’s information, comprehensiveness of practical, and ability to explain on overhauling recirculating –ball steering gear box as they perform the task using a rubrics and checklist. Provide necessary intervention.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.7 that fulfils objectives and competency.
- ✓ Conduct class test, unit test and viva session after completing every topic.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

- **Non-contact:**

- ✓ Use a rubric to assess learner’s conceptual understanding on functions of pitman arm based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner’s achievement derived using the rubric and submit through social media platform.
- ✓ Give additional question using different sources through social media platform.
- ✓ Let make learner to solve SAMPLE SEL CHECK 1.7 and submit through Google classroom, Wechat and other social media platform.
- ✓ Give case study and submit answer through google classroom.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.

E. Resources (online and offline):

- ✓ CBLM, reference books and other TLM, handouts)

- ✓ <https://www.youtube.com/watch?v=qD00DIGVhtk> (Working of recirculating type steering gearbox)

A. Learning objectives/topic

Learning objectives	Core concept(chapter/topic)
1.8.1 Define backlash. 1.8.2 State the purpose of back lash. 1.8.3 <i>Use dial gauge.</i> 1.8.4 Adjust steering gear backlash <i>Notes:</i> ✓ <i>Ensure dial gauge is handled safely.</i> ✓ <i>Ensure to use appropriate PPE.</i>	1.9 Adjusting steering gear backlash

B. Competencies

- Adjust the steering gear backlash as per the manufacture specification depending upon different vehicle.

C. Pedagogy/ Learning experience :

• Contact:

- ✓ Learner should read the INFORMATION SHEET 1.8
- ✓ Read, demonstrate and give guided practice on the OPERATION SHEET 1.8
- ✓ Use PPT, handouts and poster.
- ✓ Let learners to read and perform SKILL SHEET 1.8
- ✓ Use animation to teach.
- ✓ Provide short video clip on Adjust steering gear backlash.

• Non-contact:

- ✓ Based on the information gathered, the learner develops a model (illustration), which includes animations, vocal narratives, or pop-up texts, etc., to explain parts and functions of brake booster using relevant digital tools and programming software, such as, Scratch, MS Paint, Smart Draw, etc.
- ✓ Provide link <https://www.youtube.com/watch?v=gAD0ugRQNeK> to learn how to adjust steering gearbox play.
- ✓ Provide link <https://www.ijert.org/research/removal-of-backlash-from-steering-systems-IJERTV2IS110470.pdf> to learn about steering gear backlash..

D. Assessment:

• Contact:

- ✓ Assess learner's information, comprehensiveness of practical, and ability to adjusting steering gear backlash as they perform the task using a rubrics and checklist. Provide necessary intervention.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.8 that fulfills objectives and competency.
- ✓ Conduct class test, unit test and viva session after completing every topic.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

- **Non-contact:**

- ✓ Use a rubric to assess learner’s conceptual understanding on definition and purpose of backlash based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner’s achievement derived using the rubric and submit through social media platform.
- ✓ Give additional question using different sources through social media platform.
- ✓ Let make learner to solve SAMPLE SELF CHECK 1.8 and submit through Google classroom, Wechat and other social media platform.
- ✓ Give case study and submit answer through google classroom.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.

E. Resources (online and offline):

- ✓ CBLM, reference books and other TLM, handouts)
- ✓ <https://www.youtube.com/watch?v=gAD0ugRQNEk> (How to adjust steering gearbox play)
- ✓ <https://www.ijert.org/research/removal-of-backlash-from-steering-systems-IJERTV2IS110470.pdf> (Steering gear backlash).

A. Learning objectives/topic

Learning objectives	Core concept(chapter/topic)
1.2.1 Define power steering system. 1.2.2 State the types of power steering. 1.2.3 State the types of power steering gear box. 1.2.4 Explain the construction of integral power steering gear box. 1.2.5 Explain the operation of integral power steering gear box. 1.2.6 Replace integral power steering gear box Notes: <ul style="list-style-type: none"> ✓ <i>Ensure proper disposal of used power steering fluid.</i> ✓ <i>Ensure to use appropriate PPE.</i> 	1.10 Replace integral power steering gear box

B. Competencies

- Replace the integral power steering gear box as per the standard procedures fo any vehicle.

C. Pedagogy/ Learning experience :

- **Contact:**

- ✓ Let learner read the INFORMATION SHEET 1.9
- ✓ Read, demonstrate and give the guided practice on the OPERATION SHEET 1.9
- ✓ Use PPT, handouts and poster.
- ✓ Use animation to teach construction of integral power steering gear box.
- ✓ Make student to do individual practice on OPERATION SHEET 1.9.
- ✓ Provide short video clip on operation of integral power steering gear box.

- **Non-contact:**

- ✓ Let the learner read the INFORMATION SHEET 1.9
- ✓ Let learner go through OPERATION SHEET 1.9
- ✓ Provide link <https://www.youtube.com/watch?v=AeXj35aOK7k> to learn about how power steering pumps work.
- ✓ Provide link <https://www.youtube.com/watch?v=6bBYBP8uxYk> to learn how to change the power steering gearbox.

D. Assessment

- **Contact:**

- ✓ Let learners read and perform OPERATION SHEET 1.9 and assess according to rubrics.
- ✓ Ask learners to solve the SAMPLE SELF CHECK 1.9 that fulfills objectives and competency.
- ✓ Conduct class test, unit test, and viva session after completing every topic.
- ✓ Give additional questions from CBLM and other resources-Google/YouTube.

- **Non-contact:**

- ✓ Use a rubric to assess the learner's conceptual understanding of functions of the pitman arm based on the vocal narratives and comprehensiveness of the demo++. Provide necessary intervention to the learners based on the learner's achievement derived using the rubric and submit through the social media platform.
- ✓ Give additional questions using different sources through the social media platform.
- ✓ Let make learner to solve SAMPLE SELF CHECK 1.9 and submit through Google classroom, Wechat and other social media platforms.
- ✓ Give case study and submit through google classroom.
- ✓ Give online quiz on the topic, question and answer session through zoom meeting.

E. Resources (online and offline):

- ✓ CBLM, reference books and other TLM, handouts
- ✓ <https://www.youtube.com/watch?v=AeXj35aOK7k> (How power steering pump works).
- ✓ <https://www.youtube.com/watch?v=6bBYBP8uxYk> (How to change power steering gearbox).

MODULE: INTERPRETING ENGINEERING DRAWING

Chapter: 1 Draw isometric and mechanical parts

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

B. Competencies

Learning objectives	Core concepts (Chapters/Topics)
2.1.1 Define the scale of the drawing. 2.1.2 List types of scale. 2.1.3 Convert drawing scale Notes: <ul style="list-style-type: none"> ✓ <i>Ensure clean and neatness of drawing.</i> ✓ <i>Ensure Proper handling of drawing instruments.</i> 	2.1 Converting drawing scale

- i. Convert the drawing scales as per the standard ratios.

C. Pedagogy/Learning experience

- **Contact:**

- ✓ Let the learners read INFORMATION SHEET 2.1.
- ✓ Let the learners perform OPERATION SHEET 2.1.
- ✓ Let the learners solve SAMPLE SELF CHECK 2.1.
- ✓ Let the learner searches for more information on engineering drawing scales from the link https://bis.gov.in/other/WC_SP_46_03122014.pdf (books, internets, handouts, etc.)
- ✓ Let the learners in a group discuss on the conversion of drawing scales required for standard ratios based on the information gathered.

- **Non-contact**

- ✓ Let the learners read INFORMATION SHEET 2.1.
- ✓ Let the learner search for more information on engineering drawing scales from the link https://bis.gov.in/other/WC_SP_46_03122014.pdf (Books, internets, handouts, etc.)
- ✓ Let the learners perform OPERATION SHEET 2.1.
- ✓ Let the learners solve SAMPLE SELF CHECK 2.1.

D. Assessment

- **Contact**

- ✓ Assess the learner's ability to gather information discussed in the group.
- ✓ Assess learners' performance OPERATION SHEET 2.1.
- ✓ Assess the response on SAMPLE SELF CHECK 2.1.
- ✓ Provide necessary feedback and intervention based on the rating from the rubric.

- **Non-contact**
 - ✓ Assess learners' performance OPERATION SHEET 2.1 uploaded in Google Classroom or any other social media platforms.
 - ✓ Assess the response on SAMPLE SELF CHECK 2.1 uploaded in Google Classroom or any other social media platforms.
 - ✓ Provide necessary feedback and intervention based on the rating from the rubric

E. Resources(online and offline)

- ✓ Competency Based Learning Materials for Class X
- ✓ https://bis.gov.in/other/WC_SP_46_03122014.pdf (Explanation on the engineering drawing scales)

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

Learning objectives	Core concepts(Chapters/Topics)
2.2.1 Define isometric drawing.	2.2 Drawing Isometric blocks
2.2.2 State isometric terminologies.	
2.2.3 Draw isometric block	
2.2.4 <i>Ensure clean and neatness of drawing.</i>	
2.2.5 <i>Ensure Proper handling of drawing instruments.</i>	

B. Competencies

- Draw isometric blocks and interpret any mechanical parts into 3D drawing. as per the given dimension in standard procedures.

C. Pedagogy/learning experience

- **Contact:**
 - ✓ The learners read INFORMATION SHEET 2.2.
 - ✓ Let the learner do the presentation to the whole class.
 - ✓ Let the learners perform OPERATION SHEET 2.2.
 - ✓ Let the learners solve SAMPLE SELF CHECK 2.2
 - ✓ Share the web link <https://youtu.be/c6DygJMwos8> to understand the techniques on drawing isometric block.
 - ✓ The learners draw prepares a presentation using the information obtained from relevant sources
- **Non-contact:**
 - ✓ Let the learners read INFORMATION SHEET 2.2.
 - ✓ Share the web link <https://youtu.be/c6DygJMwos8> to understand the techniques on drawing isometric block.
 - ✓ Let the learners watch the video and prepare a mind map and posts it in the Google Classroom.

- ✓ Let the learners perform OPERATION SHEET 2.2.
- ✓ Let the learners solve SAMPLE SELF CHECK 2.2

D. Assessment

- **Contact**

- ✓ Assess the learners’ performance on OPERATION SHEET 2.2
- ✓ Assess learner’s conceptual understanding of the working mechanism of the respiratory system drawn in the form of a mind map, which is uploaded in the Google Classroom. Provide necessary intervention following the assessment of mind map.
- ✓ Assess the response on SAMPLE SELF CHECK 2.2 uploaded in Google Classroom.

- **Non-contact**

- ✓ Assess the answers of SAMPLE SELF CHECK 2.1 uploaded in Google Classroom or any other social media.
- ✓ The learner performs OPERATION SHEET 2.2 and assess their performances.
- ✓ Assess the presentation prepared and uploaded by the learner in the Google Classroom to assess the learner’s conceptual understanding on drawing isometric block. Provide necessary intervention based on the assessment of the presentation.

E. Resources(online and offline)

- ✓ Competency Based Learning Materials for Class X
- ✓ <https://youtu.be/c6DygJMwos8> (Explanation on the tips of drawing isometric block)

A. Learning objectives/Broad Theme/Strand/Chapter/Topics:

Learning Objectives	Core concepts(Chapters/Topics)
2.3.1 Define orthographic drawing. 2.3.2 List the four quadrants. 2.3.3 State types of orthographic projections. 2.3.4 Differentiate between first and third angle projection. 2.3.5 Draw orthographic projection Notes: ✓ <i>Ensure clean and neatness of drawing.</i> ✓ <i>Ensure Proper handling of drawing instruments</i>	2.3 Drawing orthographic projection

B. Competencies:

- i. Draw isometric views and orthographic projections.

C. Pedagogy/Learning Experiences

- **Contact:**

- ✓ Conduct pre-assessment on drawing of 3-D shapes.
- ✓ Let the learners draw 3-D shapes on a paper.
- ✓ Let the learners draw orthographic views from 3-D figures.

- ✓ Let the learners read INFORMATION 2.3
 - ✓ Share the web link <https://youtu.be/1sjaelzuGAK> to know basic orthographic projection.
 - ✓ Provide structures (real object) and make learners draw orthographic views.
 - ✓ Provide isometric drawing and let learners to draw orthographic view.
 - ✓ Let the learners solve OPERATION 2.3 and SAMPLE SELF CHECK 2.3
 - ✓ Compile and assign question sets related to creating orthographic drawing from structure, orthographic drawing from isometric drawing and to create 3-D shapes from orthographic drawing.
- **Non-Contact:**
 - ✓ Let the learners read INFORMATION 2.3.
 - ✓ Share the web link <https://youtu.be/1sjaelzuGAK> to know basic orthographic projection.
 - ✓ Provide isometric drawing and let learners to draw orthographic view.
 - ✓ Let the learners solve OPERATION 2.3 and SAMPLE SELF CHECK 2.3
 - ✓ Compile and assign question sets related to creating orthographic drawing from structure, orthographic drawing from isometric drawing and to create 3-D shapes from orthographic drawing and upload in Google Classroom.

D. Assessment

- **Contact**
 - ✓ Monitor the pre-assessment carried out in the classroom.
 - ✓ Provide necessary intervention and feedback.
 - ✓ Assess the learners' response to OPERATION SHEET 2.3 and SAMPLE SELF CHECK 2.3
 - ✓ Assess the learners' response to additional question on orthographic views.
- **Non-contact:**
 - ✓ Assess the learners' response to OPERATION SHEET 2.3 and SAMPLE SELF CHECK 2.3
 - ✓ Assess the learners' response to additional question on orthographic views.

E. Resources (Online or offline)

- ✓ Competency Based Learning Materials for Class X
- ✓ <https://youtu.be/1sjaelzuGAK> (Basic orthographic projection)

Resources

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