REPUBLIC OF KENYA

COMPETENCY BASED CURRICULUM FOR

AUTOMOTIVE TECHNICIAN LEVEL 6

TVET CDACC
P.O BOX 15745-00100
NAIROBI

First published 2018
Copyright © TVET CDACC

All rights reserved. No part of these occupational standards may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods without the prior written permission of the TVET CDACC, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law. For permission requests, write to the Council Secretary/CEO, at the address below:

Council Secretary/CEO
TVET Curriculum Development, Assessment and Certification Council
P.O. Box 15745–00100
Nairobi, Kenya
Email: cdacc.tvet@gmail.com

easytvet.com

easytvet.com

Table of Contents

Radvtvet.com

FOREWORD

The provision of quality education and training is fundamental to the Government's overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya's development blueprint, Vision 2030 and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution of Kenya 2010 and this resulted to the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that these Occupational Standards were developed for the purpose of developing a competency-based curriculum for Automotive Technician. These Occupational Standards will also be the bases for assessment of an individual for competence certification.

It is my conviction that these Occupational Standards will play a great role towards development of competent human resource for the automotive sector's growth and development.

easyvet.com

PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING
MINISTRY OF EDUCATION

PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, "middle-income country providing a high-quality life to all its citizens by the year 2030". Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 and Sessional Paper No. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET in order to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

The TVET Curriculum Development, Assessment and Certification
Council (TVET CDACC), in conjunction with Automotive Sector Skills Advisory Committee (SSAC have developed these Occupational Standards for Automotive technicians. These standards will be the bases for development of competency based curriculum for automotive technician Level 6.

The occupational standards are designed and organized with clear performance criteria for each element of a unit of competency. These standards also outline the required knowledge and skills as well as evidence guide.
I am grateful to the Council Members, Council Secretariat, Automotive SSAC, expert workers and all those who participated in the development of these Occupational Standards.

cavevet.com

Prof. CHARLES M. M. ONDIEKI, PhD, FIET (K), Con. EngTech.
CHAIRMAN, TVET CDACC

ACKNOWLEDGMENT

These Occupational Standards were developed through combined effort of various stakeholders from private and public organizations. I am thankful to the management of these organizations for allowing their staff to participate in this course. I wish to acknowledge the invaluable contribution of industry players who provided inputs towards the development of these Standards.

I thank TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) for providing guidance on the development of these Standards. My gratitude goes to Automotive Sector Skills Advisory Committee (SSAC) members for their contribution to the development of these Standards. I thank all the individuals and organizations who participated in the validation of these Standards.

I acknowledge all other institutions which in one way or another contributed to the development of these Standards.

Dr. LAWRENCE GUANTAI M'ITONGA, PhD
COUNCIL SECRETARY/CEO

easytvet.com

ACRONYMS

AC	Air conditioning
CDACC Council	Curriculum Development, Assessment and Certification
CI	Compression ignition
CV	Constant velocity joint
DTI	Dial test indicator
FOT	Fixed orifice tube
GPS	Global positioning system
ICT	Information and Communication Technology
KCSE	Kenya Certificate of Secondary Education
KNQA	Kenya National Qualification Authority
KNQF	Kenya National Qualification Framework
KPI	King Pin Inclination
OBD	On-board diagnostics
PPE	Personal protective equipment
SI	Spark ignition
TVET	Technical and Vocational Education and Training
TXV	Thermal expansion valve
UJ	Universal joint

easytvet.com

OVERVIEW

1. Brief description of the course

This course is designed to equip individuals with the competences required to practice as automotive technicians in the modern Kenyan motor vehicle service and repair sector. It reflects the employers' demand for qualified personnel, that would enable them to compete in an environment where the technical sophistication of vehicles is constantly evolving, and the expectations of clients are becoming ever more demanding.

The course consists of basic and core units of learning as indicated below

2. Units of Learning

Basic Units of Learning

Unit Code	Unit Title	Duration in Hours	Credit Factor
ENG/CU/AUT/BC/1/6	Demonstrate Communication Skills	40	4
ENG/CU/AUT/BC/2/6	Demonstrate Digital Literacy	60	6
ENG/CU/AUT/BC/3/6	Demonstrate Entrepreneurial Skills	100	10
ENG/CU/AUT/BC/4/6	Demonstrate Employability Skills	80	8
ENG/CU/AUT/BC/5/6	Demonstrate Environmental Literacy	40	4
ENG/CU/AUT/BC/6/6	Demonstrate occupational Safety and Health Practices	40	4
Total		**360**	**36**

Common Units of Learning

Unit Code	Unit Title	Duration in Hours	Credit Factor
ENG/CU/AUT/CC/1/6	Engineering mathematics	150	15
ENG/CU/AUT/CC/2/6	Technical Drawing	150	15
ENG/CU/AUT/CC/3/6	Automotive engineering science principles	100	10
ENG/CU/AUT/CC/4/6	Workshop technology principles	100	10

Total	500	50

Core Units of Learning

Unit Code	Unit Title	Duration in Hours	Credit Factor
ENG/CU/AUT/CR/1/6	Service and Maintain Motor Vehicles.	120	12
ENG/CU/AUT/CR/2/6	Service and Repair Motor Vehicle Engines.	170	17
ENG/CU/AUT/CR/3/6	Service Light Motor Vehicle Engine Auxiliary Systems.	100	10
ENG/CU/AUT/CR/4/6	Service Motor Vehicle Transmission Systems.	150	15
ENG/CU/AUT/CR/5/6	Service Motor Vehicle Braking Systems.	100	10
ENG/CU/AUT/CR/6/6	Service Motor Vehicle Suspension	120	12
ENG/CU/AUT/CR/7/6	Servicing vehicle steering systems	170	17
ENG/CU/AUT/CR/8/6	Servicing vehicle electrical systems	150	15
	Industrial attachment	480	48
Total		**1560**	**156**
Grand total		**2420**	**242**

eavtvet.com

The total duration for this course is 2420 hours.

3. Entry Requirements

An individual entering this course should have any of the following minimum requirements:

a) Kenya Certificate of Secondary Education (K.C.S.E.) with a minimum mean grade of C- (C minus)

Or

b) Automotive Engineering Technician Level 5 certificate with **one** year of continuous work experience

Or

c) Equivalent qualifications as determined by Kenya National Qualifications Authority (KNQA)

4. Provision for Industrial attachment

It is envisaged that the trainee will have undergone an industrial training and assessment with a recognised motor vehicle service garage as a prerequisite for completion of this training course.

5. Assessment

The course will be assessed at two levels: internally and externally. Internal assessment is continuous and is conducted by the trainer who is monitored by an internal accredited verifier while external assessment is the responsibility of TVET CDACC. As part of the continuous internal assessment process, trainees will maintain a portfolio of evidence of their achievements.

6. Certification

On successful completion of a Unit of Learning, a trainee will be issued with a Certificate that acknowledges the achievement of that competence. On successful completion of **all** units of learning, a trainee will be awarded an Automotive Technician Diploma qualification. These certificates will be issued by TVET CDACC in conjunction with training provider.

easytvet.com

BASIC UNITS OF LEARNING

COMMUNICATION SKILLS

UNIT CODE: ENG/CU/AUT/BC/1/6

Relationship to Occupational Standards

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Demonstrate communication skills**.

Duration of Unit: 40 hours

Unit Description

This unit covers the competencies required in meeting communication needs of clients and colleagues and developing, establishing, maintaining communication pathways and strategies. It also covers competencies for conducting interview, facilitating group discussion and representing the organization in various forums.

Summary of Learning Outcomes

1. Meet communication needs of clients and colleagues.
2. Develop communication strategies
3. Establish and maintain communication pathways
4. Promote use of communication strategies
5. Conduct interview
6. Facilitate group discussion
7. Represent the organization

easytvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Meet communication needs of clients and colleagues.	Communication process Modes of communication Medium of communication Effective communication Barriers to communication Flow of communication Sources of information Organizational policies Organization requirements for written and electronic communication methods Report writing Effective questioning techniques (clarifying and probing) Workplace etiquette Ethical work practices in handling communication Active listening Feedback Interpretation Flexibility in communication Types of communication strategies Elements of communication strategy	• Written • Oral

easynet.com

Learning Outcome	**Content**	**Suggested Assessment Methods**
2. Develop communication strategies	Dynamics of groups Styles of group leadership Openness and flexibility in communication skills relevant to client groups	Observation Written
3. Establish and maintain communication pathways	Types of communication pathways	Written Observation
4. Promote use of communication strategies	Application of elements of communication strategies Effective communication techniques	Written Observation
5. Conduct interview	Types of interview Establishing rapport Facilitating resolution of issues	Written Observation

	Developing action plans	
6. Facilitate group discussion	Identification of communication needs Dynamics of groups Styles of group leadership Presentation of information Encouraging group members participation Evaluating group	Written Observation
Learning Outcome	**Content**	**Suggested Assessment Methods**
	communication strategies	
7. Represent the organization	Presentation techniques Development of a presentation Multi-media utilization in presentation Communication skills relevant to client groups	• Observation • Written

easynet.com

Suggested Delivery Methods

- Interview
- Role playing
- Observation

Recommended Resources

- Desktop computers/laptops
- Internet connection
- Projectors
- Telephone

DIGITAL LITERACY

UNIT CODE: ENG/CU/AUT/BC/2/6

Relationship to Occupational Standards
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Demonstrate digital literacy**

Duration of Unit: 60 hours
Unit Description
This unit describes competencies required to use a computer and other digital devices for the purposes of communication, work performance and management at the workplace.

Summary of Learning Outcomes

1. Identify computer software and hardware
   Apply security measures to data, hardware, software in automated environment
2. Apply computer software in solving tasks
3. Apply internet and email in communication at workplace
4. Apply desktop publishing in official assignments
5. Prepare presentation packages

easytvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify computer hardware and software	• Concepts of ICT • Functions of ICT • History of computers • Components of a computer • Classification of computers	• Written tests • Oral presentation • Observation
2. Apply security measures to data, hardware and software	• Data security and control • Security threats and control measures • Types of computer crimes • Detection and protection against computer crimes • Laws governing protection of ICT	• Written tests • Oral presentation • Observation • Project
3. Apply computer software in solving tasks	• Operating system • Word processing • Spread sheets	• Oral questioning • Observation

	• Data base design and manipulation • Data manipulation, storage and retrieval	• Project
4. Apply internet and email in communication at workplace	• Computer networks • Network configurations • Uses of internet • Electronic mail (e-mail) concept	• Oral questioning • Observation • Oral presentation • Written report

Learning Outcome	**Content**	**Suggested Assessment Methods**
5. Apply desktop publishing in official assignments	• Concept of desktop publishing • Opening publication window • Identifying different tools and tool bars • Determining page layout • Opening, saving and closing files • Drawing various shapes using DTP • Using colour pellets to enhance a document • Inserting text frames • Importing and exporting text • Object linking and embedding • Designing of various publications • Printing of various publications	• Oral questioning • Observation • Oral presentation • Written report • Project
6. Prepare presentation packages	• Types of presentation packages • Procedure of creating slides • Formatting slides • Presentation of slides	• Oral questioning • Observation • Oral presentation • Written report
Learning Outcome	**Content**	**Suggested Assessment Methods**
	□ Procedure for editing objects	□ Project

Suggested Delivery Methods

easyvet.com

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Project
- Group discussions

Recommended Resources

- Desk top computers
- Laptop computers
- Other digital devices
- Printers
- Storage devices
- Internet access
- Computer software

easytvet.com

ENTREPRENEURIAL SKILLS

UNIT CODE: ENG/CU/AUT/BC/3/6

Relationship to occupational standards

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Demonstrate entrepreneurial skills**

Duration of unit: 60 hours

Unit description

This unit describes the competencies critical to demonstration of entrepreneurial aptitudes. It involves, developing business innovation strategies, developing new markets, customer base, expanding employed capital and undertaking regional/county expansion while retaining motivated staff.

Summary of Learning Outcomes

1. Develop business innovation strategies
2. Develop new products/ markets
3. Expand customers and product lines
4. Motivate all staff/workers
5. Expand employed capital base
6. Undertake regional/county business expansion

easytvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Develop business Innovation strategies	• Innovation in business • Business innovation strategies • Creativity for business development • New technologies in entrepreneurship • Linkages with other entrepreneurs • Setting strategic directions • New ideas and approaches • Entrepreneurial skills development • Market trends • Monitoring and anticipating market trends • Products and processes in entrepreneurship • Business conventions ad exhibitions • Business growth refocus	• Observation • Case studies • Individual/group assignments • projects • Written • Oral
2. Develop new products/ markets	• Feasibility study for new products • Identifying new sources	• Observation • Case studies

Learning Outcome	**Content**	**Suggested Assessment Methods**
	of raw material and resources • New target markets/customers • Increasing products and services • Marketing improvement • Entrepreneurship and business growth	• Individual/group assignments • projects • Written • Oral
3. Expand customers and product lines	• Market demand • Regulatory environment • Creating product and services competitive advantages • Creating royal client base • Identifying and maintain new customers and markets	• Oral • Observation • Case studies • Individual/group assignments • projects • Written □

	• Advance product/ service promotions • Advance market expansion • Small business records management • Book keeping and auditing for small businesses • Computer application	

Learning Outcome	**Content**	**Suggested Assessment Methods**
	software and programmes □ ICT in customer and product diversification	
4. Motivate staff/workers	• Motivation of workers • Communication at workplace for motivation purpose • Problem solving • Conflict resolution at place of work • Good staff/workers relation • Team building and team work • Staff development and enhancement • Culture of continuous improvement	• Observation • Case studies • Individual/group assignments • projects • Written
5. Expand employed capital base	• Employed capital in business • Business share holdings • Types of shares • Shares diversification • Role of shareholders • Entrepreneurship • Increasing products and services	• Observation • Case studies • Individual/group assignments • projects • Written • Oral
Learning Outcome	**Content**	**Suggested Assessment Methods**
6. Undertake county/ regional business expansion	• Region/ county identification process	• Observation • Case studies

easytvet.com

	• Regional/ county laws and regulation • Business regional/county expansion • Regional/ County business expansion • Innovation in business • Business expansion and diversification • Resources for regional/county expansion • Small business Strategic Plan • Computer software in business development • ICT and business growth	• Individual/group assignments • projects • Written • Oral □

Suggested Delivery Methods

- Instructor led facilitation of theory
- Demonstration by trainer
- Practice by trainee
- Role play
- Case study

easytvet.com

Recommended Resources

- Case studies for small businesses
- Business plan templates
- Laptop/ desktop computers
- Internet
- Telephone
- Writing materials

EMPLOYABILITY SKILLS

UNIT CODE: ENG/CU/AUT/BC/4/6

Relationship to Occupational Standards

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Demonstrate employability skills**

Duration of Unit: 50 hours

Unit Description

This unit covers competencies required to demonstrate employability skills. It involves competencies for exuding self-awareness and ability to deal with everyday life challenges; demonstrating critical safe work habits and leading a workplace team; planning and organizing work activities; applying learning, creativity and innovativeness in workplace functions; pursuing professional growth and managing time effectively in the workplace.

Summary of Learning Outcomes

1. Develop self-awareness and ability to deal with life challenges
2. Demonstrate critical safe work habits for employees
3. Lead a workplace team
4. Plan and organize work
5. Maintain professional growth and development in the workplace.
6. Demonstrate learning, creativity and innovativeness in the workplace.

easytvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Develop selfawareness and ability to deal with life challenges	• Self-awareness • Formulating personal vision, mission and goals • Strategies for overcoming life challenges • Managing emotions • Emotional intelligence • Asserting one-self • Assertiveness versus aggressiveness • Expressing personal thoughts, feelings and beliefs • Self esteem • Developing and maintaining high selfesteem • Developing and maintaining positive selfimage • Sharing personal feelings • Setting performance targets • Monitoring and evaluating performance Articulating ideas and	• Observation • Written • Oral interview • Third party report

Learning Outcome	**Content**	**Suggested Assessment Methods**
	aspirations Accountability and responsibility	
2. Demonstrate critical safe work habits for employees	• Stress and stress management • Time concept • Punctuality and time consciousness • Leisure • Integrating personal objectives into organizational objectives	• Observation • Written • Oral interview • Third party report

easyvet.com

	• Resources mobilization • Resources utilization • Setting work priorities • Developing healthy relationships • HIV and AIDS • Drug and substance abuse • Dealing with emerging issues	
3. Lead a workplace team	• Leadership • Influence • Team building • Determination of team roles and objectives • Team parameters and	• Observation • Oral interview • Written • Third party report

Learning Outcome	**Content**	**Suggested Assessment Methods**
	relationships • Individual responsibilities in a team • Forms of communication • Business communication • Complementing team activities • Gender and gender mainstreaming • Human rights protocols • Developing healthy relationships • Maintaining relationships • Conflicts and conflict resolution	
4. Plan and organize work	• Planning • Organizing • Schedules of activities • Developing work plans • Developing work goals/objectives and deliverables • Monitoring work activities • Evaluating work activities • Resource mobilization	• Observation • Oral interview • Written • Third party report

easyNet.com

	• Resource allocation • Resource utilization	

Learning Outcome	Content	Suggested Assessment Methods
	• Decision making • Problem solving • Negotiation	
4. Maintain professional growth and development in the workplace	• Avenues for professional growth • Training and career opportunities • Assessing training needs • Mobilizing training resources • Licenses and certifications for professional growth and development • Pursuing personal and organizational goals • Managing work priorities and commitments • Recognizing career advancement	• Observation • Oral interview • Written • Third party report
6. Demonstrate learning, creativity and innovativeness in the workplace	• Managing own learning • Mentoring • Coaching • Networking • Variety of learning context • Application of learning • Safe use of technology • Taking	• Observation • Oral interview • Written • Third party report
Learning Outcome	**Content**	**Suggested Assessment Methods**
	initiative/proactivity • Flexibility • Identifying opportunities • Generating new ideas • Workplace innovation • Performance improvement	

Suggested Methods of Delivery

- Instructor lead facilitation of theory
- Demonstrations
- Simulation/Role play
- Group Discussion
- Presentations
- Projects
- Case studies
- Assignments

Recommended Resources

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

easytvet.com

ENVIRONMENTAL LITERACY

UNIT CODE: **ENG/CU/AUT/BC/5/6**

Relationship to Occupational Standards:

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Demonstrate environmental literacy**

Duration of Unit: 60 hours

Unit Description

This unit describes the competencies required to control environmental hazard, control environmental pollution, comply with workplace sustainable resource use, evaluate current practices in relation to resource usage, identify environmental legislations/conventions for environmental concerns, implement specific environmental programs, monitor activities on environmental protection/programs, analyze resource use and develop resource conservation plans.

Summary of Learning Outcomes

1. Control environmental hazard
2. Control environmental Pollution
3. Demonstrate sustainable resource use
4. Evaluate current practices in relation to resource usage
5. Identify Environmental legislations/conventions for environmental concerns
6. Implement specific environmental programs
7. Monitor activities on Environmental protection/Programs
8. Analyze resource use
9. Develop resource conservation plans

easynet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Control environmental hazard	• Purposes and content of Environmental Management and Coordination Act 1999 • Storage methods for environmentally hazardous materials • Disposal methods of hazardous wastes	• Written questions • Oral questions • Observation of work procedures

	• Types and uses of PPE in line with environmental regulations • Occupational Safety and Health Standards (OSHS)	
2. Control environmental Pollution control	• Types of pollution • Environmental pollution control measures • Types of solid wastes • Procedures for solid waste management • Different types of noise pollution • Methods for	• Written questions • Oral questions • Observation of work procedures • Role play

Learning Outcome	**Content**	**Suggested Assessment Methods**
	minimizing noise pollution	
3. Demonstrate sustainable resource use	• Types of resources • Techniques in measuring current usage of resources • Calculating current usage of resources • Methods for minimizing wastage • Waste management procedures • Principles of 3Rs (Reduce, Reuse, Recycle) • Methods for economizing or reducing resource consumption	• Written questions • Oral questions • Observation of work procedures • Role play □
4. Evaluate current practices in relation to resource usage	• Collection of information on environmental and resource efficiency systems and procedures, • Measurement and recording of current	• Written questions • Oral questions • Observation of work procedures • Role play

elearnvet.com

Learning Outcome	Content	Suggested Assessment Methods
	resource usage • Analysis and recording of current purchasing strategies. • Analysis of current work processes to access information and data • Identification of areas for improvement	
5. Identify Environmental legislations/conventions for environmental concerns	• Environmental issues/concerns • Environmental legislations /conventions and local ordinances • Industrial standard /environmental practices • International Environmental Protocols (Montreal, Kyoto) • Features of an environmental strategy	• Written questions • Oral questions • Observation of work procedures □

Learning Outcome	Content	Suggested Assessment Methods
6. Implement specific environmental programs	• Community needs and expectations • Resource availability • 5s of good housekeeping • Identification of programs/Activities • Setting of individual roles /responsibilities • Resolving problems /constraints encountered	• Written questions • Oral questions • Observation of work procedures • Role play

easyvet.com

	• Consultation with stakeholders	
7. Monitor activities on Environmental protection/Programs	• Periodic monitoring and Evaluation of activities • Gathering feedback from stakeholders • Analysing data gathered • Documentation of recommendations and submission • Setting of management support systems to sustain	• Oral questions • Written tests • Practical test • Observation

Learning Outcome	**Content**	**Suggested Assessment Methods**
	and enhance the program □ Monitoring and reporting of environmental incidents to concerned /proper authorities	
8. Analyze resource use	• Identification of resource consuming processes • Determination of quantity and nature of resource consumed • Analysis of resource flow through different parts of the process. • Classification of wastes for possible source of resources.	• Written tests • Oral questions • Practical test • Observation
9. Develop resource Conservation plans	• Determination of efficiency of use/conversion of resources • Causes of low efficiency of use of	• Written tests • Oral questions • Practical test • Observation
Learning Outcome	**Content**	**Suggested Assessment Methods**
	resources □ Plans for increasing the efficiency of resource use	

easyngt.com

Suggested Delivery Methods

- Instructor led facilitation of theory
- Practical demonstration of tasks by trainer
- Practice by trainees
- Observations and comments and corrections by trainers

Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Company environmental management systems (EMS)
- Montreal Protocol
- Kyoto Protocol

easytvet.com

OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: ENG/CU/EI/BC/06/6

Relationship to Occupational Standards
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Demonstrate occupational safety and health practices**

Duration of Unit: 60 hours

Unit Description
This unit describes the competencies required to comply with regulatory and organizational requirements for occupational safety and health.

Summary of Learning Outcomes

1. Identify workplace hazards and risk
2. Identify and implement appropriate control measures to hazards and risks
3. Implement OSHA programs, procedures and policies/guidelines **Learning Outcomes, Content and Suggested Assessment Methods**

Learning Outcome	Content	Suggested Assessment Methods
1. Identify workplace hazards and risks	• Identification of hazards in the workplace and/or the indicators of their presence • Evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace • Gathering of OSH issues and/or concerns	• Oral questions • Written tests • Observation of trainees identify hazards and risks
2. Identify and implement appropriate control measure to hazards and risks	• Prevention and control measures e.g. use of PPE • Contingency measures	• Oral questions • Written tests • Practical tests • Observation of implementation of control measures
3. Implement OSH programs, procedures and policies/ guidelines	• Organization OSH program, procedures and policies/guidelines	• Oral questions • Written tests • Practical test • Observation

easynet.com

	• Implementation of OSH procedures and policies/ guidelines • Training of team members and advice on OSH standards and procedures	
Learning Outcome	**Content**	**Suggested Assessment Methods**
	Implementation of procedures for maintaining OSH-related records	

Suggested Delivery Methods

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos **Recommended Resources**

- Standard operating and/or other workplace procedures manuals Specific job procedures manuals
- Machine/equipment manufacturer's specifications and instructions Personal Protective Equipment (PPE) e.g.
- Mask
- Face mask/shield
- Safety boots
- Safety harness
- Arm/Hand guard, gloves
- Eye protection (goggles, shield)
- Hearing protection (ear muffs, ear plugs)
- Hair Net/cap/bonnet
- Hard hat
- Face protection (mask, shield)
- Apron/Gown/coverall/jump suit
- Anti-static suits
- High-visibility reflective vest

easyTVET.com

COMMON UNITS OF LEARNING

TECHNICAL DRAWING

UNIT CODE: ENG/CU/AUT/CC/1/6

Relationship to Occupational Standards
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Prepare and interpret technical drawings**

Duration of Unit: 150 hours

Unit Description
This unit covers the competencies required to prepare and interpret technical drawings. It involves competencies to select, use and maintain drawing equipment and materials. It also involves producing plain geometry drawings, solid geometry drawings, pictorial and orthographic drawings of components and application of Computer Aided Design (CAD) packages.

Summary of Learning Outcomes

1. Use and maintain drawing equipment and materials
2. Produce plane geometry drawings
3. Produce solid geometry drawings
4. Produce pictorial and orthographic drawings of components
5. Apply CAD packages

easytvet.com

Learning Outcomes, Content and Suggested Assessment Methods:

Learning Outcome	Content	Suggested Assessment Methods
1. Use and maintain drawing equipment and materials	• Identification and care of drawing equipment • Identification and care of drawing materials • Reference to manufacturer's instructions and work place procedures on use and maintenance of drawing equipment and materials • Reference to relevant environmental legislations • Use of Personal Protective Equipment (PPEs)	• Observation • Oral questioning • Written tests
2. Produce plane geometry drawings	• Types of lines in drawings • Construction of geometric forms e.g. squares, circles	• Oral questioning

	• Construction of different angles • Measurement of	• Practical tests • Observation □

Learning Outcome	Content	Suggested Assessment Methods
	different angles • Bisection of different angles and lines • Standard drawing conventions	
3. Produce solid geometry drawings	• Interpretation of sketches and drawings of patterns e.g. cylinders, prisms and pyramids • Sectioning of solids e.g. prisms, cones • Development and interpenetrations of solids e.g. cylinder to cylinder and cylinder to triangular, prism	• Observation • Practical tests • Oral questioning
4. Produce orthographic drawings	• Meaning of pictorial and orthographic drawings • Meaning of sectioning • Meaning of symbols and abbreviations • Drawing and interpretation of orthographic elevations	• Observation • Practical tests • Oral questioning

Learning Outcome	Content	Suggested Assessment Methods
	• Dimensioning of orthographic elevations • Sectioning of views • Assembly drawing	
5. Produce pictorial drawings	• Meaning of pictorial drawings • Drawing objects in isometric view • Drawing objects in oblique view	• Observation • Oral questioning • Practical tests

eavuet.com

6. Produce electrical drawings	• Electrical symbols and abbreviations • Meaning of electrical drawings • Drawing of electrical diagrams e.g. block, schematic, circuit, line and wiring	• Observation • Oral questioning • Practical tests
7. Apply CAD packages	• Identification of CAD packages e.g. AutoCAD, circuit maker • Use of CAD packages in drawing of: • Plane geometry • Solid • Orthographic	• Observation • Oral questioning • Practical tests
Learning Outcome	**Content**	**Suggested Assessment Methods**
	• Pictorial • Electrical e.g. block, schematic, circuit, line and wiring	

Suggested Methods of Delivery

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions

Recommended Resources

easytvet.com

- Drawing room
- Drawing instruments e.g. T-squares, set squares, drawing sets
- Drawing tables
- Pencils, papers, erasers
- Masking tapes
- Computers installed with relevant CAD packages

ENGINEERING MATHEMATICS

UNIT CODE: ENG/CU/AUT/CC/1/6

Relationship to Occupational Standards

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Apply engineering mathematics**

Duration of Unit: 150 hours

Unit Description

This unit describes the competencies required by a technician in order to apply algebra apply trigonometry and hyperbolic functions, apply complex numbers, apply coordinate geometry, carry out binomial expansion, apply calculus, solve ordinary differential equations, carry out mensuration, apply power series, apply statistics, apply numerical methods, apply vector theory and apply matrix.

Summary of Learning Outcomes

1. Apply Algebra
2. Apply Trigonometry and hyperbolic functions
3. Apply complex numbers
4. Apply Coordinate Geometry
5. Carry out Binomial Expansion
6. Apply Calculus
7. Solve Ordinary differential equations
8. Carry out Mensuration
9. Apply Power Series
10. Apply Statistics
11. Apply Numerical methods
12. Apply Vector theory
13. Apply Matrix

eadytvet.com

Learning Outcomes, Content and Suggested Assessment Method

Learning Outcome	Content	Suggested Assessment Methods
1. Apply Algebra	• Base and Index • Law of indices • Indicial equations • Laws of logarithm • Logarithmic equations • Conversion of bases • Use of calculator • Reduction of equations	• Written tests • Oral questioning • Assignments • Supervised exercises

	• Solution of equations reduced to quadratic form • Solutions of simultaneous linear equations in three unknowns • Solutions of problems involving AP and GP	

Learning Outcome	**Content**	**Suggested Assessment Methods**
2. Apply Trigonometry and hyperbolic functions	• Half -angle formula • Factor formula • Trigonometric functions • Parametric equations • Relative and absolute measures • Measures calculation • Definition of hyperbolic equations • Properties of hyperbolic functions • Evaluations of hyperbolic functions Hyperbolic identities • Osborne's Rule • Ashx+bshx=C equation • One-to-one relationship in functions • Inverse functions for one-to-one relationship • Inverse functions for trigonometric functions • Graph of inverse functions • Inverse hyperbolic functions	• Written tests • Oral questioning • Assignments • Supervised exercises
3. Apply	Definition of complex	Assignments

Learning Outcome	**Content**	**Suggested Assessment Methods**
complex numbers	numbers	• Oral questioning

	• Stating complex numbers in numbers in terms of conjugate argument and • Modulus • Representation of complex numbers on the Argand diagram • Arithmetic operation of complex numbers Application of De Moivre's theorem • Application of complex numbers to engineering	• Supervised exercises • Written tests
4. Apply Coordinate Geometry	• Polar equations • Cartesian equation • Graphs of polar equations • Normal and tangents • Definition of a point • Locus of a point in relation to a circle • Loci of points for given mechanism	• Written tests • Oral questioning • Assignments • Supervised exercises
5. Carry out Binomial Expansion	Binomial theorem Power series using binomial theorem Roots of numbers using	• Written tests • Oral questioning • Assignments

Learning Outcome	**Content**	**Suggested Assessment Methods**
	binomial theorem. Estimation of errors of small changes using binomial theorem.	Supervised exercises
6. Apply Calculus	• Definition of derivatives of a function • Differentiation from fist principle • Tables of some common derivatives • Rules of differentiation • Rate of change and small change • Stationery points of functions of two variables • Definition of integration • Indefinite and definite integral	• Written tests • Oral questioning • Assignments • Supervised exercises

easytvet.com

	• Methods of integration application of integration. • Integrals of hyperbolic and inverse functions	
7. Solve Ordinary differential equations	• Types of first order differential equations • Formation of first order differential equation	• Written tests • Oral questioning • Assignments • Supervised

Learning Outcome	**Content**	**Suggested Assessment Methods**
	• Solution of first order differential equations • Application of first order differential equations • Formation of second order differential equations for various systems • Solution of second order differential equations • Application of second order differential equations	exercises
8. Carry out Mensuration	• Units of measurements • Perimeter and areas of regular figures • Volume of regular solids • Surface area of regular solids • Area of irregular figures • Areas and volumes using Pappus theorem	• Written tests • Oral questioning • Assignments • Supervised exercises
9. Apply Power Series	• Definition of the term power series • Taylor's theorem • Deduction of McLaurin's theorem to obtain power series	• Written tests • Oral questioning • Assignments • Supervised exercises

Learning Outcome	**Content**	**Suggested Assessment Methods**
	Application of Taylor's theorem and McLaurin's theorems in numerical work	

10. Apply Statistics	• Measures of central tendency mean, mode and median • Measures of dispersion • Variance and standard deviation • Definition of probability • Laws of probability • Expectation variance and S.D. • Types of distributions • Mean, variance and SD of probability distributions • Application of probability distributions	• Assignments • Oral questioning • Supervised exercises • Written tests • Simulation • Data modelling
11. Apply Numerical methods	• Definition of interpolation and extrapolation • Application of interpolation • Application of interactive methods to solve equations	• Assignments • Oral questioning • Supervised exercises • Written tests
Learning Outcome	**Content**	**Suggested Assessment Methods**
	Application of interactive methods to areas and volumes	
12. Apply Vector theory	• Vectors and scalar in two and three dimensions • Operations on vectors: Addition and Subtraction • Position vectors • Resolution of vectors	• Assignments • Oral questioning • Supervised exercises • Written tests
13. Apply Matrix methods	• Matrix operation • Determinant of 3x3 matrix • Inverse of 3x3 matrix • Solution of linear simultaneous equations in 3 unknown • Application of matrices	• Assignments • Oral questioning • Supervised exercises • Written tests

easyvet.com

Suggested Delivery Methods

- Group discussions
- Demonstration by trainer
- Exercises by trainee

Recommended Resources

- Scientific Calculators
- Rulers, pencils, erasers
- Charts with presentations of data
- Graph books
- Dice
- Computers with internet connection

easytvet.com

AUTOMOTIVE ENGINEERING SCIENCE PRINCIPLES UNIT
CODE: ENG/CU/AUT/CC/3/06

Relationship to Occupational Standards

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Apply automotive engineering science principles**

Duration of Unit: 160 hours

Unit Description

This unit describes the competencies required by a technician in order to apply a wide range of automotive science principles in their work. It includes using concepts of science, resolution of forces, determining effects of various loads on engineering systems, analyse properties of materials, determine parameters of a fluid system, describe the nature of friction and apply the gas laws. **Summary of Learning Outcomes**

1. Resolution of forces
2. Determine effects of loads in automotive systems
3. Analyse properties of materials
4. Determine the nature of friction in automotive systems.
5. Solve problems related to motion
6. Apply simple machines concepts
7. Determine the effect of heat and apply the gas laws
8. Use the concept of density and pressure.

easyTvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Resolve forces.	• Define force • State and explain the parallelogram, triangle and polygon of forces theorems • Determine the resultant of coplanar forces • Application of force theorems	• Written tests • Oral questioning • Assignments • Supervised exercises
2. Determine effects of loads in automotive systems	• Define moment of a force about an axis • Analysis of point loads and reaction Calculations. • State the principle of moments	• Written tests • Oral questioning • Assignments • Supervised exercises.

	• Determination of center of gravity • Application of moments to automotive systems	• Practical tests □ □
3. Analyse properties of materials	• Definition of mechanical properties of materials • Draw the stress strain graph • Carry out material testing • Determine factors affecting choice of materials. • Calculate direct, shear and torsion stress in materials	• Assignments • Oral questioning • Supervised exercises • Written tests. • Practical tests

Learning Outcome	**Content**	**Suggested Assessment Methods**
4. Determine the nature of friction in automotive systems	• Definition of friction • State the laws of friction • State the effects of friction • Calculate the force to overcome friction on horizontal and inclined planes, bearings, brakes, belts, and clutch	• Assignments • Oral questioning • Practical tests • Observation • Supervised exercises • Written tests
5. Solve problems related to motion	• Definition of terms related to motion • State newton's laws of motion, law of conservation of momentum • Calculate: velocity, acceleration, momentum, impulse, inertia force and simple harmonic motion. • Draw velocity time graphs. • Determine relationship between linear and angular motion. • Analyze motion of a vehicle on a curved and banked track	• Assignments • Supervised exercises • Written tests • Practical test
5. Apply simple machines concepts in automotive	□ Definition of: work, power energy, mechanical advantage, velocity ratio and efficiency.	• Assignments • Oral questioning • Practical tests • Observation

Learning Outcome	**Content**	**Suggested Assessment**

cavtvet.com

		Methods
engineering	• Describe simple machines: gears, levers, pulleys, screw jack, and wheel and axle. • Apply the law of machine. • Determination of work, energy, power, mechanical advantage, velocity ratio and efficiency	• Supervised exercises • Written tests
6. Determine the effect of heat and apply the gas laws	• Definition of heat, temperature and heat capacity • Explain the effect of heat on matter. • Describe modes of heat transfer • State the gas laws. • Measure quantity of heat and temperature. • Solve problems on heat and gases.	• Assignments • Supervised exercises • Written tests • Practical test • Assignments • Oral questioning • Practical tests • Observation • Supervised exercises • Written tests
7. Use the concept of density and pressure.	• Define density, relative density and pressure. • Measure density, relative density and pressure using appropriate instruments. • State Archimedes principle and the law of floatation. • Calculate problems on	• Written test • Assignments • Oral questioning • Practical tests • Observation • Supervised exercises • Written tests
Learning Outcome	**Content**	**Suggested Assessment Methods**
	density, relative density and pressure. • Application of pressure in brakes, pumps, jacks and other engineering systems.	

Suggested Delivery Methods

- Group discussions
- Demonstration by trainer Online videos
- Power point presentation
- Exercises by trainee

Recommended Resources

- Scientific Calculators
- Relevant reference materials
- Stationeries
- Automotive workshop
- Relevant practical materials
- Laboratories
- Internet

easytvet.com

WORKKSHOP TECHNOLOGY PRINCIPLES

UNIT CODE: ENG/CU/AUT/CC/ 4/06

Relationship to Occupational Standards:
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Apply workshop technology principles**

Duration of Unit: 240 Hours

Unit description
This unit describes the competencies required by an automotive technician in order to apply a wide range of workshop technology skills in their work. It involves use of different methods to produce work pieces using basic tools while observing occupational safety and health legislations, regulations and safe working practices, interpret working drawings, select appropriate techniques for a given task to achieve specified results as well as perform housekeeping.

Summary of Learning Outcome

1. Use technical drawing to plan work operations
2. Choosing of appropriate tools and materials.
3. Measure and mark out dimensions on work pieces
4. Use hand tools to cut and file parts
5. Use drills to make holes
6. Thread using taps and dies
7. Produce components using a lathe machine
8. Assemble metal parts and sub-assemblies
9. Polish finished work
10. Perform housekeeping
11. Inspect finished work for accuracy and quality
12. Maintenance of tools and equipment

easytvet.com

Learning Outcomes, Content and suggested assessment methods

Learning Outcome	Content	Suggested Assessment Methods
1. Use technical drawing to plan work operations	• Reading and extraction of information (dimensions, tolerances, BS/ANSI Drawing Standards, geometric ISO symbols & abbreviations) • Development of working procedure/ operational plan	• Administration of written and oral tests • Assessment of worksheet/ operation plans

2. Choosing of appropriate tools and materials	• Types of hand tools Using hand tools. • Using machine tools • Selection of tools as per the specific operation • Inspection and/or recalibration of tools • Demonstration of correct handling of tools. • Selection of material for the given component	• Observation of correct selection of tools for specific operation • Observation of inspection and/or recalibration of tools • Observation of appropriate handling of tools • Administration of oral and written questions
3. Measure and mark out dimensions on work pieces	• Use of marking out tools • Laying out work piece(s) • Transfer of dimensions onto the work piece(s)	• Observation of laying out of work piece(s) • Assessment of transferred

Learning Outcome	**Content**	**Suggested Assessment Methods**
		dimensions Administration of oral and written questions
4. Use hand tools to cut and file parts	• Types of hand tools • Uses of hand tools • Selection of tools as per the specific operation • Inspection and/or recalibration of tools • Demonstration of correct handling of tools	• Observation of correct selection of tools for specific operation • Observation of inspection and/or recalibration of tools • Observation of appropriate handling of tools • Administration of oral and written questions

easytvet.com

5. Use drills to make holes	• Marking and centre punching the hole • Selecting and mounting drill bits • Mounting and clamping work pieces • Drilling hole to specification • Inspecting the hole	• Observation of degree of surface finish • Assessment of finished surface(s) using inspection tools • Assessment of finished surface(s)

Learning Outcome	**Content**	**Suggested Assessment Methods**
		visually
6. Thread using taps and dies	• Selecting taps and dies based on operation plan • Setting up the taps and dies • Cutting threads to specifications	• Observation of the joined or fitted parts • Assessment of the joined or fitted parts • Assessment of functionality
7. Produce components using a lathe machine	• Cleaning of work environment (waste sorting and disposal) • Cleaning and storing of tools and equipment • Servicing and maintenance of machine (lubrication, inspection, alignment and adjustment)	• Observation of servicing and maintenance of the machine • Observation of clean working environment • Observation clean and stored tools and equipment
8. Assemble metal parts and subassemblies	• fitting parts • Quality control (Dimensions, Tolerances, surface finishing,	• Observation of the joined or fitted parts • Assessment of the

baatyat.com

Learning Outcome	Content	Suggested Assessment Methods
	Alignment)	joined or fitted parts □ Assessment of functionality
9. Polish finished work	• Polishing • Cleaning	□ Assessing polishing and cleaning of parts
10. Perform housekeeping	• Cleaning of work environment (waste sorting and disposal) • Cleaning and storing of tools and equipment • Servicing and maintenance of machine (lubrication, inspection, alignment and	• Observation of cleaned working environment • Observation of cleaned and stored sheet metal tools and equipment
11. Inspect finished work for accuracy and quality	• Measuring • Surface finishing • Functionality	□ Assessing measurements, finishing and functionality of machined parts
12. Maintenance of tools and equipment	• Cleaning tools and equipment after operations • Servicing and maintenance of tools and equipment (lubrication, inspection, alignment and adjustment, coolant, safety guard)	• Observation of cleaning of lathe machine tool • Observation of servicing and maintenance of tools and
Learning Outcome	**Content**	**Suggested Assessment Methods**
		equipment Administration of oral and written tests

easytvet.com

Suggested Delivery Methods

- Demonstration by trainer
- Discussions

- Practical work by trainee(s)
- Exercises
- Industrials visits Internet.
- Simulation

List of Recommended Resources

Tools and equipment suggested but not limited to:

- Welding
- Drilling machines
- Vices
- Burnishing machine
- Cutting tools
- Combination square
- Centre punch
- Centre lathe
- scribers
- calipers
- Dies and taps
- Surface plate
- V-blocks
- Dial gauge Die stock
- Engineer's square
- File card
- Assorted Files
- Clamps
- Assorted hand tools
- Hammers
- Measuring tools
- Drill bits
- Assorted inspection tools and equipment
- Inspection and measuring tools, GO and NOT GO gauges
- Jigs and fixture
- Pliers
- Rotary disc abrasive grinder
- Reamers
- Saw
- Screwdrivers
- Spiral lowering
- Tap wrench
- Vacuum cleaners
- V-block
- Workbenches
- Vacuum cleaners
- Mops/ Brooms and buckets
- Firefighting equipment

easytvet.com

- First Aid kit

Materials and supplies suggested but not limited to:

- Personal safety gear:
- Goggles
- Safety shoes
- Overall
- Cap
- Ear Muffs
- Gloves
- Drawing papers
- Raw materials
- Mild steel plate
- Sheet metal
- Brass sheets
- Zinc sheets
- Aluminum sheets
- Bright Drawn Mild Steel
- Carbon steel
- Brass rods
- Aluminum rods
- Abrasive materials
- Grinding paste
- Cotton wastes
- Cleaning detergents

easytvet.com

CORE UNITS OF LEARNING
PERFORMING VEHICLE BASIC MAINTENANCE

UNIT CODE: ENG/CU/AUT/CR/1/6

Relationship to Occupational Standards
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Perform vehicle basic maintenance.**

Duration of Unit: 120hours

Unit description
This unit specifies the competencies required to perform vehicle basic maintenance. It involves assessing vehicle mechanical and operational condition, carrying out diagnosis tests, replacing service parts, replenishing fluids and lubrications, conducting tests and complete the procedure.

Summary of Learning Outcomes

1. Assess vehicle mechanical and operational condition
2. Carry out diagnostic tests
3. Service vehicle lubrication system
4. Replenish fluids and lubricants
5. Replace/service vehicle service parts
6. Conduct road tests
7. Carry out adjustments to vehicle components and systems
8. Service Vehicle Wheels and Tyres 9. Finalize service and repair procedures.

easyvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Assess vehicle mechanical and operational condition.	• Preparing periodic maintenance schedule • Preparing work area • Assessment methods • OSHA 2007 • Conducive working environment e.g. appropriate ventilations, free from fumes and poisonous gases • use of personal protective equipment and clothing	• Observation • Written • Oral

	(PPE) • selection and use of appropriate tools and equipment • use of protective covering to prevent damage to vehicles • Draining and disposal of used oils • Disposing of scrap components • Preparing mechanical and operational assessment report	

Learning Outcome	**Content**	**Suggested Assessment Methods**
2. Carry out diagnostic tests.	Identifying sources of technical information and regulations Identifying vehicle system codes Assessing condition and performance of the vehicle system Identifying defects using diagnostic equipment Adhering to manufacturers' specifications and guidelines Proper use of diagnostic machine in the vehicle Adhering to agreed timescales and completion times Keeping customers informed of progress Preparing diagnostic assessment report Maintenance documentation and records	Observation Written Oral
3. Service vehicle lubrication system	Diagnosing vehicle lubrication system Replacing Engine	Practical Oral Observation

easyTVET.com

Learning Outcome	Content	Suggested Assessment Methods
	transmission and hydraulic filters Greasing vehicle components Testing lubrication system pressure	Written
4. Replenish fluids and lubricants.	Identification and selection of appropriate tools, equipment, vehicle and personal protective equipment; Assessment methods used to check for vehicle conformity; Identification of the different systems to be inspected including: Engine Chassis Brakes Wheels and tyres Steering and suspension Transmission and driveline Electrical and electronics Exterior vehicle body Vehicle interior Use of approved inspection checklists and	Practical exercises with observation checklists conducted by trainer. Oral questioning with checklist conducted by trainer to assess underpinning knowledge. Short tests to assess underpinning knowledge. Learner

Learning Outcome	Content	Suggested Assessment Methods
	recording documentation.	portfolio of evidence.

easytvet.com

5. Replace/service vehicle service parts.	Identification of appropriate diagnostic equipment and instrumentation; The importance of equipment calibration before use; Identification of systems to be tested including: Battery and charging; Fuel; Ignition; Engine management; Exhaust emission; Lighting; Electrical and electronics; Steering and suspension geometry Air-conditioning. Procedures for carrying out diagnostic tests and identification of faults Carrying out adjustments in accordance with manufacturers	Practical exercises with observation checklists conducted by trainer. Oral questioning with checklist conducted by trainer to assess. Underpinning knowledge. Short answer written tests to assess underpinning knowledge. Learner portfolio of evidence.

Learning Outcome	Content	Suggested Assessment Methods
	specifications • Rectification of identified faults to restore performance to original specifications • The use of checklists and recording documentation.	
6. Conduct road tests.	• The use of manufacturers' specifications to identify the correct types and grades of lubricants and fluids for systems including:	Practical exercises with observation checklists conducted by trainer. Oral questioning with checklist conducted by trainer to assess underpinning knowledge. Short answer written tests to assess underpinning knowledge. Learner portfolio of evidence

easyuvat.com

	• Brakes and clutch operation; • Power assisted steering; • Cooling system; • Windscreen washers; • Diesel engine emission control. • Lubricants and fluids replenished to the levels and quantities as specified by the manufactures • Protective measures to avoid spillage that may damage the vehicle and cause a safety and health	

Learning Outcome	Content	Suggested Assessment Methods
	hazard Identification of service parts that should be replaced as part of routine maintenance including: Oil, fuel, air and diesel exhaust filters; Wiper blades; Spark plugs; Brake pads/linings; Drive belts; Seals and gaskets. The use of manufacturers' part numbers to verify that the parts are correct for the type of vehicle; Use of appropriate tools for removal and replacement to ensure correct replacement without damage; Tests to ensure that the replacement parts perform to manufacturers specifications; Disposal of waste oil, fluids, and scrap parts in accordance with current	

eadytvet.com

Learning Outcome	Content	Suggested Assessment Methods
	environmental regulations.	
7. Carry out adjustments to vehicle components and systems.	Use of manufacturers technical information to identify operating specifications and tolerances; Special tools and equipment for checking and carrying out adjustments; Identification of components and systems that are to be checked and adjusted including: Valve clearances; Spark plug gaps; Exhaust emission settings; Wheel, steering and suspension alignment; Headlight alignment; Drive belt tension; Engine idling speed; Lubricants and fluid levels; fuel pressure; Brake clearances; Tyre rotation;	Practical exercises with observation checklists conducted by trainer. Oral questioning with checklist conducted by trainer to assess underpinning knowledge. Short answer written tests to assess underpinning knowledge. Learner portfolio of evidence.

Learning Outcome	Content	Suggested Assessment Methods
	Wheel balancing. The use of approved checklists and documentation to record checks and adjustments carried out.	
8. Service Vehicle Wheels and Tyres	Identifying and repairing tyre punctures Performing wheel balancing	Practical Observations

	Performing tyre fitting on the rim Straightening bent wheel rims Replacing tyre pressure nozzles Maintaining tyre pressure	
9. Finalize service and repair procedures.	All maintenance activities completed within an agreed timescale; The vehicle interior and exterior clean and presentable in compliance with company policy; A report for the customer that includes all the work that was carried out during the routine maintenance,	Practical exercises with observation checklists conducted by trainer. Oral questioning with checklist conducted by trainer to
Learning Outcome	**Content**	**Suggested Assessment Methods**
	including results of assessments, rectifications and replaced parts; A report to advise the customer of any further defect(s) that were identified during the routine maintenance, with recommendations for further action; Maintenance records completed accurately in an approved format.	assess underpinning knowledge. Short tests to assess underpinning knowledge. Learner portfolio of evidence.

easyvet.com

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting lecturer/trainer from the motor vehicle service and repair sector;
- Industrial visits.

Recommended Resources

Tools

Comprehensive set of hand tools for motor vehicle maintenance and repair.

Equipment

- A fully equipped motor vehicle maintenance workshop;
- Fully functional light vehicle(s);
- Vehicle lift;
- Specialist tools and diagnostic equipment appropriate for the different makes of vehicles that are being maintained;
- Exhaust emission tester;
- Headlamp alignment equipment;
- Internet access to manufacturers' technical information;
- Torque setting tools;
- Personal protective equipment (PPE) and suitable coverings to protect vehicles;
- Facilities for the disposal of waste oil and used parts;
- Customer database and systems for recording maintenance records.

Materials and supplies

Consumables for maintaining light vehicles including:

- Engine and transmission lubricants;
- Fluids for cooling systems, brakes, clutch, windscreen washer, hydraulic power assisted steering and diesel engine exhaust emission control;

Replacement parts including:

- Air, oil, exhaust, and air conditioning filters;
- Oil seals and gaskets;
- Brake pads and linings;
- Spark plugs;
- Screen wiper blades; Drive belts.
- Vehicle cleaning materials; Hand cleaner.

Reference materials

- Manufacturers service manuals for vehicles that are being serviced; Appropriate automotive engineering text books available on numerous websites

easynet.com

SERVICING AND REPAIRING VEHICLE ENGINE COMPONENTS

UNIT CODE: ENG/AUT/CR/2/6

Relationship to Occupational Standards
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Service and repair vehicle engine components**

Duration of Unit: 170 hours

Unit Description:
This unit describes the competencies required in service and repair vehicle engine components. It involves troubleshooting and servicing vehicle engine components, performing vehicle engine overhaul, servicing vehicle engine cooling system, servicing vehicle engine exhaust system and lubricating vehicle engine system

Summary of Learning Outcomes:

1. Troubleshoot and service vehicle engine components
2. Perform vehicle engine overhaul
3. Service vehicle engine cooling system
4. Service vehicle engine exhaust system
5. Lubricate vehicle engine system

easttvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Troubleshoot vehicle engine components conditions	Use of Personal protective equipment (PPE) Health and safety regulations Engine removal Dismantling of engine Engine parts Servicing engine parts Reassembling of engine parts Engine fitting Re-installation checks	• Practical • Oral questioning • Written test

2. Perform vehicle engine overhaul	Replacement of Engine oil seals Replacement of Engine oil rings/ piston gudgeon pin Replacement of Timing belts/chains Replacement of Engine bearings Replacement of Engine pulleys Replacement of Engine V-belts Replacement of Engine gaskets Servicing Engine blocks Replacement of Water/oil pump Adjustment of Tappet clearance Replacement of Engine	• Practical • Observation • Written tests • Writing reports

Learning Outcome	**Content**	**Suggested Assessment Methods**
	camshaft Grinding Valve seats Replacement of Valve guides Replacement of Oil sump/strainer/PCV Replacement of Engine mountings Performing Engine tune up	

easytvet.com

3. Service vehicle engine cooling system	Checking and testing Radiator cap Checking and testing cooling radiator Checking and testing cooling system hoses Checking and testing thermostat operations Checking and testing thermistor switches/ sensors Checking and testing water pump Checking and testing cooling fan operation Checking and testing cooling system bleeding cooling system reading vehicle engine coolant 	• Practical • Oral • Short tests • Learner portfolio of evidence.
Learning Outcome	**Content**	**Suggested Assessment Methods**
	replenishing coolant	
4. Service vehicle engine exhaust system	Checking leakage Checking blockage Checking and testing catalytic converter/ particulate filters Repairing exhaust system leaks Installing and mounting exhaust system Checking and testing oxygen sensor	• Practical • Oral • Short tests • Learner portfolio of evidence.

easytvet.com

5. lubricate vehicle engine system	Draining and replacing engine oil Replacing engine transmission and hydraulic filters Greasing light vehicle components Greasing heavy commercial vehicle components Greasing Heavy machinery Reading Lubricants	• Practical • Oral • Short tests • Learner portfolio of evidence.

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting lecturer/trainer from the motor vehicle service and repair sector;
- Industrial visits.

easytvet.com

Recommended Resources

Tools

- Comprehensive set of hand tools for the service and repair of motor vehicle Engines.

Equipment

- Engine instructional models;
- A fully equipped motor vehicle maintenance workshop;
- Fully functional vehicle(s);
- Functional engines;
- Engine components;
- Vehicle lift/inspection pit;
- Specialist tools and diagnostic equipment appropriate for the different makes and types of vehicle engines that are being maintained;
- Internet access to manufacturers' technical information/data
- Torque setting tools;
- Personal protective equipment (PPE) and suitable coverings to protect vehicles;
- Vehicle protective coverings;
- Facilities for the disposal of waste oil and used parts;
- Customer database and systems for recording maintenance records.

Materials and supplies

- Digital instructional material including DVDs and CDs;
- Consumables for service and repair of vehicle engines including:
- Engine lubricants;
- Sealants, oil seals and gaskets;
- Cleaning materials;
- Hand cleaner;
- Cotton waste for cleaning

Reference materials

- Manufacturers service manuals for the vehicles that are being serviced;
- Appropriate automotive engineering text books available on numerous websites e.g.

SERVICING VEHICLE FUEL SYSTEM

UNIT CODE: ENG/CU/AUT/CR/3/6

Relationship to Occupational Standards

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Service vehicle fuel system**

easytvet.com

Duration of Unit: 150hours

Unit Description:

This unit describes the competencies required to service vehicle fuel system. It involves servicing fuel components, replacing petrol fuel pump and diesel injector pump, performing injector timing, testing injectors for pressure and voltage.

Summary of Learning Outcomes:

By the end of the unit, the trainee should be able to:

1. Service fuel components e.g. injectors, tank
2. Replace petrol fuel pump
3. Replace diesel injector pump, rail, pipes and nozzles.
4. Perform injector pump timing
5. Test fuel injectors for injection pressure and voltage

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Service fuel components e.g. injectors, tank.	- The observance of Kenyan regulations concerned with health, safety and the environment; Disposal of faulty components - The use of personal protective equipment and clothing (PPE) used throughout work activities; - Components of vehicle fuel system - Tools and equipment for servicing fuel system - Troubleshooting of fuel system - Dismantling of the fuel system of the vehicle Use of technical data in servicing and repairing components.	- Practical exercises - Oral questioning - Learner portfolio of evidence
2. Replace petrol fuel pump	- Functions of the petrol fuel pump. - Principle of operation of	- Observation - Practical - Projects

easyTVet.com

Learning Outcome	**Content**	**Suggested Assessment Methods**
	the pump - Structure of the pump - Servicing and fitting of the pump in the vehicle fuel system - Precautions when handling petrol fuel pump.	

3. Replace diesel injector pump, rail, pipes and nozzles.	Functions of the Diesel injector pump Rail Fuel pipes Nozzles Principle of operation of the: Diesel injector pump Rail Fuel pipes Nozzles Structure of the pump Injector pump Rail Fuel pipes Nozzles Servicing and fitting of the diesel pump components	Practical exercises Oral questioning Written tests Learner portfolio of evidence.
Learning Outcome	**Content**	**Suggested Assessment Methods**
	in the vehicle fuel system Precautions when handling petrol fuel pump	
4. Perform injector pump timing	Definition of the injector pump timing Importance of the injector pump timing Injector timing units Tools and equipment for injector pump timing	Practical exercises Oral questioning
5. Test fuel injectors for injection pressure and voltage	Tools and equipment for testing Manufacturer's specification in setting pressure and voltage Procedure for testing voltage and pressure for fuel injectors Default voltage and pressure for fuel injectors.	Practical exercises Oral questioning Learner portfolio of evidence. Observation

easytvet.com

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting lecturer/trainer from the motor vehicle service and repair sector;
- Industrial visits.

Recommended Resources

Tools

- Comprehensive set of hand tools for the service and repair of motor vehicle auxiliary systems

Equipment

- A fully equipped motor vehicle maintenance workshop;
- Fully functional vehicle(s)
- Functional fuel system;
- Fuel system components and units;
- Vehicle lift/inspection pit;
- Specialist tools and diagnostic equipment appropriate for the different makes and types of vehicle that are being maintained;
- Internet access to manufacturers' technical information;
- Torque setting tools;
- Personal protective equipment (PPE) and suitable coverings to protect vehicles;
- Facilities for the disposal of waste oil and used parts;
- Customer database and systems for recording maintenance records.

Materials and supplies

- Digital instructional material including DVDs and CDs; Consumables for service and repair of vehicle auxiliary systems including;
- Oil seals and gaskets;
- Coolants;
- Cleaning materials; Hand cleaner;
- Dusters.

Reference materials

- Manufacturers service manuals for the vehicles that are being serviced;
- Appropriate automotive engineering text books available on numerous websites

easyvet.com

SERVICING VEHICLE TRANSMISSION SYSTEMS

UNIT CODE: ENG/CU/AUT/CR/4/6

Relationship to Occupational Standards
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Service vehicle transmission systems.**

Duration of Unit: 150hours

Unit Description
This unit specifies competencies required to service vehicle transmission system. It involves preparing to service vehicle transmission systems, removing, assessing, repairing/replacing and testing the vehicle transmission system.

Summary of Learning Outcomes

1. Organize to service vehicle
2. Troubleshoot vehicle transmission system
3. Overhaul gearbox (manual)
4. Overhaul gearbox (semi/ automatic)
5. Carry out hydraulic/ tiptronic system tests and measurements.

eadtvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Organize to service vehicle	• The observance of Kenyan regulations concerned with health, safety and the environment; The • adoption of safe working practices to avoid injury and the prevention of damage to vehicles and property; • The use of personal protective equipment and clothing (PPE) used throughout work activities; • The selection and use of appropriate tools and equipment relevant to all activities; • Steps taken to avoid spillage of fluids that may cause personal injury and damage vehicles; The use of • protective covering to prevent damage to vehicles; The disposal of • scrap	• Practical • Oral questioning Written tests • Learner • portfolio of evidence.

Learning Outcome	**Content**	**Suggested Assessment Methods**
	components, waste oils and fluids in accordance with current legal requirements and company policy.	

easyrtet.com

2. Troubleshoot vehicle transmission system	How transmission systems and their related units and components are constructed and operate; The importance of using appropriate technical information for the removal of units; Cleaning of components to facilitate inspection and assessment Correct methods and procedures of inspecting and assessing transmission components including: Damage; Wear; Fracture. Troubleshooting techniques Evaluation of components	Written tests Observation Report writing Practical

Learning Outcome	**Content**	**Suggested Assessment Methods**
	for: Serviceability; Unserviceability; Need for replacement; Need for adjustment	

easytvet.com

3. Overhaul gearbox unit (manual)	How transmission units and components are removed and replaced for the type of vehicle worked upon. Units include: Manual friction clutch; Torque converter; Manual gearbox; Propeller shaft and centre; support bearing; Drive shafts; Final drive; Differential; Transaxle Vehicle transmission components Bearings; Wheel hubs; Gears; Synchronizer;	Practical Oral questioning Short tests to assess underpinning knowledge. Learner portfolio of evidence.

easytvet.com

Learning Outcome	**Content**	**Suggested Assessment Methods**
	Gearbox shafts and thrust plates; Gear selectors, sensors and linkages; Constant velocity (CV) and universal joints (UJ); Clutch assemblies release bearings; Transmission unit mountings. Correct methods and procedures for dismantling transmission units; Importance of the use of manufactures' part numbers for replacement parts	

	Assembling of components in accordance with manufacturers' procedures including: Torque setting; Clearances; Adjustments; End-float; Tolerances.	

Learning Outcome	Content	Suggested Assessment Methods
	Selection and use of gaskets, sealants, seals, fittings and fasteners	
4. Overhaul gearbox unit (semi/ automatic)	How transmission systems and their related units and components are constructed and operated Importance of the use of manufactures' part numbers for replacement parts; Reassembling components in accordance with manufacturers' procedures including: Torque setting; Clearances; Adjustments; End-float; Tolerances. Selection and use of gaskets, sealants, seals, fittings and fasteners; Transmission components Units include: Torque converter; 	Practical exercises Oral questioning Learner portfolio of evidence.

easyNet.com

Learning Outcome	Content	Suggested Assessment Methods
	Semi/ automatic gearbox; Front clutch Rear clutch Front brake band Rear brake band Sun wheel gear Planetary gear Carrier gear Pressure pump Shift valve	
5. Carry out hydraulic/ tiptronic system tests and measurements	Types of post vehicle transmission system tests Importance of testing after reassembly. The importance of completing all service and repair activities within an agreed timescale.	Practical exercises Oral questioning Short tests to assess under knowledge. Learner portfolio of evidence.

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting lecturer/trainer from the motor vehicle service and repair sector;
- Industrial visits.

Recommended Resources

Tools

- Comprehensive set of hand tools for the service and repair of motor vehicle transmission systems.

Equipment

- Transmission Instructiona
- A fully equipped motor vehicle maintenance workshop;
- Fully functional light vehicle(s);
- Transmission units;
- Vehicle lift/inspection pit;
- Gearbox jack;
- Specialist tools and diagnostic equipment appropriate for the different makes and types of vehicle transmission systems that are being maintained;
- Automatic transmission test equipment;
- Internet access to manufacturers' technical information;
- Torque setting tools;
- Personal protective equipment (PPE) and suitable coverings to protect vehicles;
- Facilities for the disposal of waste oil and used parts;
- Customer database and systems for recording maintenance records

Materials and supplies

- Digital instructional material including DVDs and CDs
- Consumables for service and repair of vehicle transmission systems including:
- Transmission lubricants
- Oil seals and gaskets
- Cleaning materials
- Hand cleaner
- Dusters

easytvet.com

Reference materials

- Manufacturers service manuals for the vehicles that are being serviced
- Appropriate automotive engineering text books available on numerous websites

SERVICING VEHICLE STEERING SYSTEMS

UNIT CODE: ENG/CU/AUT/CR/5/6

Relationship to Occupational Standards

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Service vehicle steering system**.

Duration of Unit: 120 hours

Unit Description:

This unit specifies competencies required to service vehicle steering system. It involves assessment, removal, servicing and replacement of vehicle steering components. It also involves fitting and testing vehicle steering components and documenting vehicle steering service.

Summary of Learning Outcomes:

1. Assess vehicle steering system
2. Remove steering components
3. Assess serviceability of vehicle.
4. Replace/service vehicle steering.
5. Fit and test vehicle steering components.
6. Document vehicle steering system service

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Method
6. Assess vehicle steering system	The observance of Kenyan regulations concerned with health, safety and the environment; The use of personal protective equipment and clothing (PPE) used throughout work activities; The disposal of scrap components, waste oils and fluids in accordance with current legal requirements and company policy. Functions of steering system in the vehicle Types of steering systems Conventional Twin-axle	Practical exercises Oral questioning Written test Learner portfolio of evidence.

7. Remove steering components	Functions of steering system Components of steering system Layout of various steering	Practical exercises Oral questioning Written test

Learning Outcome	Content	Suggested Assessment Method
	systems Tools and equipment for servicing steering system Dismantling of the steering system Safety precautions in servicing steering system Disposal of faulty components	Learner portfolio of evidence.
8. Assess serviceability of vehicle.	Diagnosis and servicing of steering gearbox Worm and wheel Worm and sector Worm and nut Worm and roller Recirculating Rack and pinion Diagnosis, service and replacement of steering systems Conventional Power assisted Leakages Over steering Under steering	Practical exercises Oral questioning Written test Learner portfolio of evidence.

Learning Outcome	Content	Suggested Assessment Method
	Power	

cavtvet.com

	Components of four wheel steering system	
9. Replace/service vehicle steering.	The importance of using appropriate technical information as a guide for assessment; Correct methods and procedures for dismantling steering units; Cleaning of components to facilitate inspection and assessment of components; Using visual and measurement methods and procedures for inspecting and assessing components for: Damage; Wear; Corrosion; Fracture; Distortion. Evaluate components for: Serviceability; Unserviceability;	Practical exercises Oral questioning Written test Learner portfolio of evidence.

Learning Outcome	**Content**	**Suggested Assessment Method**
	Tolerances; Need for replacement; Need for adjustment. Importance of the use of manufactures' part numbers for replacement parts; Selection and use of gaskets, seals, shims, fittings and fasteners;	

easytvet.com

	• Steering wheel centralisation; • Test and evaluate the performance of the steering units and components after reassembly.	
10. Fit and test vehicle steering components.	• The selection and use of appropriate tools and equipment for the replacement of suspension and steering units; • Replacement of steering units and components. • Securing and adjusting external linkages,	• Practical exercises Oral • questioning Written test • Learner portfolio of • evidence
Learning Outcome	**Content**	**Suggested Assessment Method**
	connections and operating mechanisms; • Replenish lubricants and fluids as prescribed; • Testing and components for satisfactory operation; • Setting steering geometry	
11. Document vehicle steering system service	• Importance of testing vehicle steering system. • Types of tests done on steering system. Data analyzation and report writing. The importance of completing all service and • repair activities within an agreed timescale and keeping others informed of progress	• Practical exercises • Oral questioning Written test • Learner • portfolio of evidence

easynet.com

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting lecturer/trainer from the motor vehicle service and repair sector;
- Industrial visits.

Recommended Resources

Tools

Comprehensive set of hand tools for the service and repair of motor vehicle suspension and steering systems.

Equipment

- Steering systems instructional models
- A fully equipped motor vehicle maintenance workshop
- Fully functional light vehicle(s)
- Steering units
- Vehicle lift/inspection pit,
- Specialist tools and diagnostic equipment appropriate for the different makes and types of vehicle that are being worked on;
- Steering geometry measurement equipment;
- Internet access to manufacturers' technical information
- Torque setting tools
- Personal protective equipment (PPE) and suitable coverings to protect vehicles.
- Facilities for the disposal of waste oil and used parts;
- Customer database and systems for recording maintenance records

easitvet.com

Materials and supplies

Digital instructional material including DVDs and CDs

Consumables for service and repair of suspension and steering systems including:

- Steering and suspension lubricants including grease
- Power assisted steering fluid
- Oil seals and gaskets
- Cleaning materials
- Hand cleaner
- Dusters

Reference materials

- Manufacturers service manuals for the vehicles that are being serviced

- Appropriate automotive engineering text books available on numerous websites e.g.

SERVICING VEHICLE SUSPENSION SYSTEMS

UNIT CODE: ENG/CU/AUT/CR/6/6

Relationship to Occupational Standards
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Service vehicle suspension**.

Duration of Unit: 120 hours

Unit Description:
Unit description:
This unit specifies competencies required to service vehicle suspension system. It involves assessment, removal, servicing and replacement of vehicle suspension components. It also involves fitting and testing vehicle suspension components and documenting vehicle suspension service.

easytvet.com

Summary of Learning Outcomes:

1. Assess vehicle suspension system.
2. Remove vehicle suspension components.
3. Assess vehicle suspension components serviceability.
4. Replace/service vehicle suspension components.
5. Fit and test vehicle suspension components.
6. Vehicle suspension system service documentation

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Method

1. Assess vehicle suspension system.	The observance of Kenyan regulations concerned with health, safety and the environment; The use of personal protective equipment and clothing (PPE) used throughout work activities; The disposal of scrap components, waste oils and fluids in accordance with current legal requirements and company policy. Functions of suspension system in the vehicle Types of suspension systems MacPherson strut Wishbone Construction Operation Suspension units in a vehicle	• Practical exercises • Oral questioning Written test • Learner portfolio of evidence.

easytvet.com

Learning Outcome	**Content**	**Suggested Assessment Method**
	Springs Arms Dampers Air suspension Hydra gas Hydro pneumatic Hydraulic suspension Rubber suspension Hydrolastic	

2. Remove vehicle suspension components.	• The importance of using appropriate technical information throughout servicing and repair activities; • Identification and selection of appropriate tools, equipment, and personal protective when removing suspension units and components; • Correct methods and procedures for the removal of suspension units. The layout and operation of suspension systems; The construction and	• Practical exercises • Oral questioning Written test • Learner • portfolio of evidence.

Learning Outcome	**Content**	**Suggested Assessment Method**
	operation of suspension systems units including: • Suspension coil and leaf springs; • Torsion bar spring; • Suspension dampers; • Suspension struts; • Control arms; • Tie rods; • Anti-roll bar; • Hydro-Pneumatic and control unit;	

easyviet.com

3. Assess vehicle suspension components serviceability.	Troubleshooting vehicle suspension components Tools and equipment for troubleshooting vehicle suspension system Using visual and measurement methods and procedures for inspecting and assessing components for: Damage; Wear; Corrosion; Fracture; 	Practical exercises Oral questioning Written test Learner portfolio of evidence.

Learning Outcome	**Content**	**Suggested Assessment Method**
	Distortion. Servicing vehicle suspension system Materials used in servicing vehicle suspension system Disposal of faulty vehicle suspension system	

easyNet.com

4. Replace/service vehicle suspension components.	Cleaning of components to facilitate inspection and assessment of components Evaluate components for: Serviceability; Unserviceability; Tolerances; Need for replacement; Need for adjustment. Components reassembled in accordance with manufacturers' procedures, torque settings and adjustments; Importance of the use of manufactures' part numbers for replacement parts; Selection and use of 	Practical exercises Oral questioning Written test Learner portfolio of evidence.

Learning Outcome	**Content**	**Suggested Assessment Method**
	gaskets, seals, shims, fittings and fasteners; Test and evaluate the performance of the suspension and steering units and components after reassembly.	

Easytvet.com

5. Fit and test vehicle suspension components.	• The selection and use of appropriate tools and equipment for the replacement of suspension and steering units; • Procedure of replacing suspension • Securing and adjusting external linkages, connections and operating mechanisms; • Replenishing of lubricants and fluids. • Setting of suspension geometry.	• Practical exercises Oral • questioning Written test • Learner portfolio of • evidence
6. Vehicle suspension system service documentation	• Importance of testing vehicle suspension system. • Types of tests done on suspension system.	• Practical exercises Oral • questioning
Learning Outcome	**Content**	**Suggested Assessment Method**
	• Data analyzation and report writing. The • importance of completing all service and repair activities within an agreed timescale and keeping others informed of progress	• Written test • Learner portfolio of evidence

elimutvet.com

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting lecturer/trainer from the motor vehicle service and repair sector;
- Industrial visits.

Recommended Resources
Tools

Comprehensive set of hand tools for the service and repair of motor vehicle suspension and steering systems.

Tools

Comprehensive set of hand tools for the service and repair of motor vehicle suspension and steering systems.

Equipment

- Suspension systems instructi
- A fully equipped motor vehicle maintenance workshop
- Fully functional light vehicle(s)
- Suspension units
- Vehicle lift/inspection pit,
- Specialist tools and diagnostic equipment appropriate for the different makes and types of vehicle that are being worked on;
- Internet access to manufacturers' technical information
- Torque setting tools
- Personal protective equipment (PPE) and suitable coverings to protect vehicles.
- Facilities for the disposal of waste oil and used parts;
- Customer database and systems for recording maintenance records

Materials and supplies

Digital instructional material including DVDs and CDs

Consumables for service and repair of suspension and steering systems including:

- Steering and suspension lubricants including grease
- Power assisted steering fluid
- Oil seals and gaskets
- Cleaning materials
- Hand cleaner
- Dusters

Tools

Comprehensive set of hand tools for the service and repair of motor vehicle suspension and steering systems.

Reference materials

- Manufacturers service manuals for the vehicles that are being serviced
- Appropriate automotive engineering text books available on numerous websites

easyuel.com

SERVICING VEHICLE BRAKING SYSTEMS

UNIT CODE: ENG/CU/AUT/CR/7/6

Relationship to Occupational Standards
This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Service vehicle braking systems**.

Duration of Unit: 240hours

Unit Description
This unit specifies competencies required to service motor vehicle braking system. It involves, assessing, servicing, replacing or repairing and maintaining vehicle braking units and components. It includes final testing to ensure satisfactory operation to the customer's specification.

Summary of Learning Outcomes

1. Assess vehicle braking system
2. Dismantle wheel brake assembly parts
3. Assess braking components
4. Replace brake units and components
5. Replace brake cylinders
6. Service brake system

easytvet.com

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Method

7. Assess vehicle braking system	• Selection and use of appropriate tools and equipment • Kenyan health and safety regulations • Safe working practices • Conducive working environment e.g. Ventilation, dust and fumes free • Personal protective equipment(PPE) and clothing • Work area cleaning Motor vehicle cleaning. • Brake fluid draining and disposed • Steps taken to avoid spillage of fluids and damage to vehicles 	• Observation • Written • Oral
8. Dismantle wheel brake assembly parts	The construction and operation of the following types of braking systems:	• Observation • Written • Oral

Learning Outcome	**Content**	**Suggested Assessment Method**

easyvet.com

	• Mechanical brakes; • Hydraulic brakes; • Pneumatic brakes Antilock brakes; Traction control. • Using appropriate technical information • Methods and procedures for the removal of brake units; • The operation of the following components: • Master cylinders; • Wheel cylinders; • Brake lines; • Brake servo units; • Brake discs; • Callipers; • Brake pads; • Brake pedal; • Drum; • Shoes and lining; • Brake adjusters; • Brake sensors and actuators;	

easynet.com

Learning Outcome	**Content**	**Suggested Assessment Method**
	• ABS unit; • Parking brake cable; • Hydraulic brake fluid.	

9. Assess braking components	• Methods and procedures for disassembling braking system • Cleaning braking components for inspection and assessment • Methods and procedures of inspecting and assessing braking components • Evaluating brake components for: • Serviceability, • Unserviceability, • Need for replacement, • Need for adjustment • Replacing worn out and damage components • Assembling of braking components • Selection and use of seals, fittings and fasteners; • Test and evaluate the performance of brake units	• Observation • Written • Oral

easyhet.com

Learning Outcome	**Content**	**Suggested Assessment Method**
	and components after reassembly.	

10. Replace brake units and components.	• Manufacturers' technical specification replacing braking units and components • Replacing braking units and components • Replacing brake pads and linings • Replacing Brake callipers and drum • Replacing Brake flexible pipes • Replacing Brake adjusters/actuators (HCV) • Servicing Parking brake • Replenishing brake fluids Use of manufactures' part numbers for replacement parts • Testing braking units and components	• Observation • Written • Oral
11. Replace brake cylinders	• Replacing Brake master cylinder • Servicing Brake booster	• Observation • Written • Oral
Learning Outcome	**Content**	**Suggested Assessment Method**
12. Service brake system	• Assembling Drum/disc brakes • Replenishing and bleeding Brake fluid • Servicing Brake booster and ABS system • Adjusting Braking (Dynamometer test) • Servicing Auxiliary brakes • Conducting Vehicle road test • Adhering to Service and repair time frame • Documentation of Service and repair	• Observation • Written • Oral

easynet.com

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer
- Guided learner activities
- Research project assignments
- Supervised activities and projects in a workshop
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting expert worker from the motor vehicle service and repair sector
- Industrial visits.

Recommended Resources

Tools

- Comprehensive set of hand and power tools for the service and repair of motor vehicle brake system **Equipment**
- Brake system A fully equipped motor vehicle maintenance workshop
- Fully functional vehicle(s)
- Brake units
- Vehicle lift/inspection pit
- Jack and stands
- Brake testers/platform /roller
- Specialist tools and diagnostic equipment appropriate for the different makes and types of vehicle braking systems that are being maintained
- Internet access to manufacturers' technical information
- Torque setting tools
- Personal protective equipment (PPE) and suitable coverings to protect vehicles
- Facilities for the disposal of waste brake fluid and used parts
- Customer database and systems for recording maintenance records

Materials and supplies

- Digital instructional material including DVDs and CDs;
- Brake fluids;
- Lubricants;
- Seals, fasteners and fittings;

- Cleaning materials;
- Hand cleaner;
- Dusters;
- Vehicle protective covering

Reference materials

- Manufacturers service manuals for the vehicles

SERVICING VEHICLE ELECTRICAL SYSTEMS

UNIT CODE: ENG/CU/AUT/CR/8/6

Relationship to Occupational Standards

This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Service vehicle electrical systems**

easytvet.com

Duration of Unit: 120 hours

Unit Description:

This unit specifies competencies required to service vehicle electrical systems. It involves diagnosing electrical systems and servicing ignition, electrical accessories, air conditioning, auxiliary, lighting and vehicle electrical motors systems.

Summary of Learning Outcomes:

1. Diagnose electrical systems
2. Service vehicle ignition system
3. Service vehicle electrical accessories
4. Service vehicle air conditioning system
5. Service vehicle charging systems
6. Service vehicle auxiliary system
7. Service vehicle lighting system
8. Service vehicle electrical motors
9. Install Vehicle safety systems

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Diagnose electrical systems	• The importance of verifying electrical defect(s) with the client; • The importance of referring to appropriate technical information throughout diagnostic and rectification activities; • The use of relevant electrical diagnostic equipment including on • multi meters scanners • code readers • board diagnostics • The use of correct and systematic methods and procedures for the removal of components. • Measures taken to prevent electrical hazards.	• Practical exercises with observation checklist • Oral questioning • Written test • Learner portfolio of evidence.
2. Service vehicle ignition system	• Types of ignition systems • Coil ignition • Magneto ignition	• Practical • Project • Observation

Learning Outcome	Content	Suggested Assessment Methods

easytvet.com

	• Transistor assisted ignition • Electronic ignition • Capacitor discharge ignition • Operating principles of ignition system • Coil ignition • Primary and secondary • Contact breaker points • Condenser • Spark plugs • Distributor • Battery • High tension leads • Switch • Operation • Construction components of ignition systems • Diagnosing and repair of ignition system • Diagnosing tools and equipment • Testing of ignition system	□ Written test
3. Service vehicle electrical accessories	□ The importance of confirming replacement accessory compatibility with	• Practical exercises • Oral

Learning Outcome	**Content**	**Suggested Assessment Methods**
	the vehicle; • Confirmed of the accessories with legislations in terms of legality and prohibition; • Fitting of the accessories to the vehicle • Accessory installed in accordance with prescribed guidelines; • Accessory tested after fitting to confirm correct operation.	questioning □ Written test

easytvet.com

4. Service vehicle air conditioning systems	• Definition of vehicle air conditioning • Construction and operation of air condition system • Evaporator • Heater blower motor • Condenser • Pump • Drier • Piping • Electric control of vehicle air conditioning system • Diagnosing of air conditioning system	• Practical exercises • Oral questioning • Learner portfolio of evidence.

Learning Outcome	**Content**	**Suggested Assessment Methods**
5. Service vehicle charging systems	• Vehicle charging circuit components • Charging circuit principles • Dynamo • Alternator • Parts of charging system • Generator/dynamo/alternator • Rectifier • Regulator • Stator • Rotor • Battery • Switch • Dismantle vehicle charging system • Diagnose and repair faults in a charging system	• Practical exercises • Oral questioning • Written test • Learner portfolio of evidence.

easytvet.com

6. Service vehicle auxiliary systems.	• Auxiliary components of vehicles • Windscreen • Radio and television • Camera • GPRs • Wipers • Mirrors	• Practical exercises • Oral questioning □ Written test • Learner portfolio of evidence.

Learning Outcome	**Content**	**Suggested Assessment Methods**
	• Central locking • Windows and doors • Gauges • Horns • Security alarms • Air bags • Principles of operations of auxiliary components • Diagnosing and servicing of the components • Installation of auxiliary components	
7. Service vehicle lighting systems	• Definition of vehicle lighting system • Lighting system layouts • Construction and operation of different types of vehicles lamps • Diagnosis and repair of vehicle lighting system • Vehicle lighting circuits • Types of lamps • Beam setting • Manual • Optical	• Practical • Oral • Written test
Learning Outcome	**Content**	**Suggested Assessment Methods**

easyvet.com

	□ Switches	
8. Service vehicle electrical motors	• Definition of electrical motors • Principles of operation of electrical motors • Types of electrical motors • Handling of vehicle electrical motors • Servicing of motors • Components of motors • Uses of motors • Fitting of electrical motors in vehicles • Disposal of faulty electrical motors • Electrical motor calculations	• Practical • Oral • Written test • Project
9. Install Vehicle safety systems	• Installing Airbags • Connecting Safety belts • Mounting electrical components related to vehicle • Fitting anti-roll components • Fitting vehicle tracker	• Practical • Observation • Oral questions

easytvet.com

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting lecturer/trainer from the motor vehicle service and repair sector;
- Industrial visits.

Recommended Resources

Tools

Comprehensive set of hand and power tools for the diagnosis service and repair of motor vehicle electrical systems

Equipment

- Electrical system instructional models;
- A fully equipped motor vehicle maintenance workshop;
- Fully functional light vehicle(s);

- Vehicle lift/inspection pit;
- Specialist tools and diagnostic equipment appropriate for the different makes and types of vehicle electrical systems that are being maintained including multi-meters, scanners and code readers;
- Internet access to manufacturers' technical information;
- Torque setting tools;
- Personal protective equipment (PPE);
- Vehicle protective coverings;
- Facilities for the disposal of used parts;

Reference materials

- Manufacturers service manuals for the vehicles that are being serviced;
- Appropriate automotive engineering text books available on numerous websites e.g.
- Vehicle Construction and Use Regulations;
- After-market manufacturer's manuals.

Tools

Comprehensive set of hand and power tools for the diagnosis service and repair of motor vehicle electrical systems

- Customer database and systems for recording maintenance records.

Materials and supplies

Digital instructional material including DVDs and CDs

Consumables for service and repair of vehicle electrical systems including:

- Vehicle Electrical cables and connectors
- Seals, fasteners and fittings
- Cleaning materials
- Dusters
- Aftermarket accessories including GPS systems, dash cameras; radios and speakers, auxiliary lights.

easytvet.com