

1.0 GENERAL INTRODUCTION

1.1 National Goals for Education

The overall education policy goal of the Government of Kenya is to achieve the Millennium Development Goals (MDGs) and Education for all (EFA) goals by 2015 in tandem with the national and international commitments. The vision of the Ministry of Education, is “to have a globally competitive education, training and research for Kenya’s sustainable development” while the mission is “to provide, promote, coordinate the provision of quality education, training and research for the empowerment of individuals to become responsible and competent citizens who value education as a lifelong process” as envisaged by Kenya Vision 2030. The national goals of education are given below:

- i) **Foster nationalism, patriotism and promote national unity**
Kenya’s people belong to different ethnic groups, races and religions, but these differences need not divide them. They must be able to live and interact as Kenyans. It is a paramount duty of education to help the youth acquire this sense of nationhood, by removing conflicts and by promoting positive attitudes of mutual respect, which enable them to live together in harmony, and foster patriotism in order to make a positive contribution to the life of the Nation.

- ii) **Promote the social economic, technological and industrial needs for national development**
Education should prepare the youth of the country to play an effective and productive role in the life of the nation.
 - **Social Needs**
Education in Kenya must prepare children for the changes in attitudes and relationships, which are necessary for the smooth process of a rapidly developing modern economy. There is bound to be a silent social revolution following in the wake of rapid modernization. Education should assist our youth to adapt to this change.

 - **Economic Needs**
Education in Kenya should produce citizens with skills, knowledge, expertise and personal qualities that are required to support a growing economy. Kenya is building up a modern and independent economy, which is in need of adequate domestic manpower.

■ Technological and Industrial Needs

Education in Kenya should provide the learners with the necessary skills and attitudes for Industrial development. Kenya recognizes the rapid industrial and technological changes taking place, especially in the developed world. We can only be part of this development if our education system deliberately focused on knowledge, skills and attitudes that will prepare the youth for these changing global trends.

- iii) **Promote individual development and self-fulfilment**
Education should provide opportunities for the fullest development of individual talents and personality. It should help children to develop their potential, interests and abilities. A vital aspect of individual development is character building.
- iv) **Promote sound moral and religious values**
Education should provide for the development of knowledge, skills and attitudes that will enhance acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.
- v) **Promote social equality and responsibility**
Education should promote social equality and foster a sense of social responsibility within an education system, which provides equal education opportunities for all. It should give all children varied and challenging opportunities for collective activities and corporate social service, irrespective of gender, ability or geographical environment.
- vi) **Promote respect for and development of Kenya's rich and varied cultures**
Education should instil in the youth of Kenya an understanding of past and present cultures and their valid place in contemporary society. The children should be able to blend the best of traditional values with the changed requirements that, must follow rapid development in order to build a stable and modern society.
- vii) **Promote international consciousness and foster positive attitudes towards other nations**
Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should, therefore, lead the youth of

the country to accept membership in this international community with all the obligations and responsibilities, rights and benefits that this membership entails.

viii) Promote positive attitudes towards good health and environmental protection

Education should inculcate in the youth the value for good health in order to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth to appreciate the need for a healthy environment.

1.2 National Aims of Technical Training Programmes

The aims of the technical training at both post primary and post secondary levels should be to:

- a) provide training opportunities for the increasing number of school leavers to enable them to be self-supporting
- b) develop practical skills and attitudes which will lead to income generating activities in the urban and rural areas through self-employment
- c) provide practical education and training skills which are responsive and relevant to
- d) Kenya's agricultural, industrial, commercial and economic needs
- e) provide the technical knowledge and vocational skills necessary to enhance the pace of this nation's development
- f) encourage self-employment while at the same time producing skilled artisans, technicians and technologists for both formal and informal sectors at the ratio of one technologist to five technicians to 30 craftsmen/artisans (1:5:30).

1.3 Objectives of the Technician Training Programmes

The general objectives of the technician training programmes are to:

- a) develop skills which will be responsive and relevant to the country's human resources required at the middle level;
- b) prepare the trainees so that they can enter the world of work with confidence for either salaried employment or self-employment;
- c) impart adequate skills which will enable the trainee to

perform middle supervisory functions.

2.0 Introduction to the Course

The Diploma in Automotive Engineering course is designed for Kenya Certificate of Secondary Education graduates (or equivalent qualifications), to provide trainees with skills, knowledge and attitudes that will enable them perform and manage tasks in the Vehicle industry.

The course is in modular form and it is designed to enable trainees acquire adequate competencies for formal and informal employment and at the same time prepare them for further training.

The course is in three modules. Each module prepares the trainee to perform specific tasks and jobs whose total value combined will impart the desired competencies, which will produce the required graduate By the end of the course.

The course puts emphasis on practical work and competence acquisition, thus, the trainee is required to spend adequate time on practical lessons.

The trainers are encouraged to continuously carry out research to establish the emerging trends and issues in each area and integrate them in the teaching. The trainers are further encouraged to take into considerations the interests of persons with disability as prescribed in the Persons with Disability Act of 2003.

The graduate of the course will be able to service, diagnose and repair faults in Vehicles, manage an automotive workshop and market vehicle parts while upholding the professional ethics and standards.

2.2 General Objectives of the Course

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

- a) test and analyze vehicle performance
- b) interpret technical information on vehicle body work and performance
- c) manage a vehicle production line
- d) apply information communication technology in the vehicle industry
- e) design and implement environment, health and safety programmes
- f) apply information communication technology (ICT) in vehicle production line and research
- g) create a firm foundation for further training.

2.3 General Regulations

2.3.1 Approval of the Training Institutions

Institutions offering this course should be recognized and approved by the Ministry responsible for Training.

2.3.2 Duration of the Course

The course is designed to have 2970 hours. The trainee spends 2310 hours in the institution and 660 hours in industrial attachment. The course is structured in **THREE** Modules as outlined below:

	Institution Time (Hours)	Industrial Attachment Time (Hours)	Total Time (Hours)
Module I	990	-	990
Module II	660	330	990
Module III	660	330	990
Total	2310	660	2970

2.3.3 Entry Requirements

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

a) Passed Kenya Certificate of Secondary Education (KCSE) with a Mean grade of C (plain) with C plain in cluster subjects i.e. Mathematics, English and Physics/Physical science.

Or

b) Passed Craft Certificate in Automotive Engineering

Or

c) Passed National Vocational Certificate of Education and Training (NVCET) Motor Vehicle Technology Level II Option II graduate

Or

d) Equivalent qualifications as shall be determined by Kenya National Examinations Council (KNEC)

2.3.4 Examinable Units

All the units in each module of the course are examinable

The examinations shall include Theory and Practical phase tests for the core competency areas in each Module which shall include:

Module I		
3.1.0	Communication Skills	- Theory
4.1.0	Life Skills	- Theory
5.1.0	Information Communication Technology (ICT)	- Theory and Practice
6.1.0	Entrepreneurship Education	- Theory
7.1.0	Mathematics I	- Theory
8.1.0	Mechanical Science	- Theory
9.1.0	Electrical and Electronics Principles	- Theory and Practice
10.1.0	Basic Engineering Drawing	- Practice
11.1.0	Materials Technology and Metallurgy	Theory and Practice
12.1.01.0	Workshop Technology	
12.1.0	Vehicle technology	- Theory and Practice
Module II		
13.2.0	Business Plan	- Practice
14.2.0	Mathematics II	- Theory
15.2.0	Strength of Materials	- Theory and Practice
16.2.0	Mechanics of Machines	- Theory and Practice
17.2.0	Industrial Organisation and Management	- Theory
18.2.0	Engineering Drawing and Design	- Practice
19.2.0	Engine Technology	- Theory and Practice
20.2.0	Vehicle Body Work	- Theory and Practice
Module III		
21.3.0	Computer Aided Design (AutoCAD)	- Practice

22.3.0	Thermodynamics	-	Theory and Practice
23.3.	Fluid Mechanics	-	Theory and Practice
24.3.0	Control Systems and Instrumentation	-	Theory and Practice
25.3.0	Mathematics III	-	Theory
26.3.0	Auto Electric and Electronic	-	Theory and Practice
27.3.0	Trade Project	-	Theory and Practice

Candidates do not have to take all the papers of a module at the same sitting

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2.4 Attendance and Course Work Requirements

The candidates are expected to register for training at an institution approved for the course for the theoretical and practical studies.

2.4.1 Coursework Marks

Continuous assessment marks for the course work must be kept by the institution and details must be submitted to the Kenya National Examinations Council (KNEC) in respect of each candidate entered for the examinations at least two weeks before the external examination is taken.

2.4.2 Coursework Assessment

Continuous assessment will be given a weighting of 30% and the external examinations by KNEC will be given a weighting of 70% in the determination of the final grade.

2.4.3 Compulsory Industrial Attachment/Internship for Trainees

Before the end of the course, every trainee shall undergo industrial an attachment/internship of 660 hours which shall be taken in two phases. Industrial attachment shall be an integral part of training and its assessment shall form part of the final grade and certification.

The training institutions in collaboration with the organization where the trainee is attached shall supervise the trainee during the Industrial Attachment. The examining body shall provide the modalities of industrial attachment assessment.

2.4.4 Project Work

A project in this context means a research carried out by an individual trainee. It may be practical, mathematical, evaluative, and descriptive or research based project. The project must have well defined Objectives so that the trainee has something definite to aim at, without inhibiting his/her initiative. The aim of the project is to give trainees an opportunity to carry out an independent work. The management and the assessment methods of project work shall be determined by KNEC and the training institutions.

2.5 Examinations and Award of Certificates

2.5.1 Assessment

The assessment of all the modules shall be competency based.

2.5.2 Internal Examinations

The training institutions will conduct course work and/or project work assessments based on the competences acquired during the training. The institutions will offer internal examinations By the end of each module and keep these records for use By the end of the course to determine the final grade. The course work or project work and/or assessments shall also be used during the re-entry to the course or for the award of credit transfer.

2.5.3 External Examinations

The Kenya National Examinations Council (KNEC) will offer external examinations to trainees in all modules covered during the training.

2.5.4 Eligibility for Candidates Entering Into External Examinations

Candidates for external examinations must at the time of entry to the examinations, have successfully completed the required competencies in each course modules.

2.5.5 Coursework/continuous Assessment

Coursework/continuous Assessment will be prepared and marked by the institutions.

The institutions will issue statement of results while the examining body will award a certificate after completion of the relevant modules.

2.5.6 Examination Results

In order to qualify for the award of Diploma in Automotive Engineering the candidate must pass all the modules of the course. Results of the examination as a whole will be issued in five classes and for the individual papers will be in eight grades. Each candidate will receive all records of performance, giving the result in terms of class and grade.

The relationship between classes and grades is:

- Pass with distinction Grade 1 and 2
- Pass with credit Grade 3 and 4
- Pass Grade 5 and 6
- Referred Grade 7
- Fail Grade 8

Candidates, who fail any paper (module unit) in a particular module, will be REFERRED in the failed paper and will be allowed to re-sit three (3) times and pass within a period of five (5) years after the date of the first sitting. Thereafter the candidate will be discontinued from further re-sitting the paper(s).

2.5.7 Award of Certificate

The KNEC will issue the candidates with result slips for Modules passed and a final certificate in Diploma Automotive Engineering.

2.5.8 General Examination Regulation

In the event of any inconsistency arising between the regulations as set out in this syllabus and the General Regulations published by the examining body, the General Regulations of the KNEC shall prevail.

2.6 Course Coding and Time Allocation Diploma in Automotive Engineering

Code	Module Units	Time Hrs
Module I		
3.1.0	Communication Skills	66
4.1.0	Life Skills	66
5.1.0	Information And Communication Technology (ICT)	99
6.1.0	Entrepreneurship Education	66
7.1.0	Mathematics I	132
8.1.0	Mechanical Science	66
9.1.0	Electrical and Electronics Principles	66
10.1.0	Basic Engineering Drawing	99
11.1.0	Materials Technology and Metallurgy I	66
12.1.01.	Workshop Technology	99

0		
12.1.0	Vehicle Technology	165
Total Time for Module I		990

Module II		
13.2.0	Business Plan	44
14.2.0	Mathematics II	66
15.2.0	Strength of Materials	66
16.2.0	Mechanics of Machines	66
17.2.0	Industrial Organisation and Management	66
18.2.0	Engineering Drawing and Design	66
19.2.0	Engine technology	142
20.2.0	Vehicle Body Work	144
Time for Module II		660
Time for Industrial Attachment		330
Total Time for Module II		990
Module III		
21.3.0	Computer Aided Design	88
22.3.0	Thermodynamics	88
23.3.0	Fluid Mechanics	44
24.3.0	Control Systems and Instrumentation	88
25.3.0	Mathematics III	66
26.3.0	Auto Electrics and Electronics	236
27.3.0	Trade Project	50
Time for Module III		660
Time for industrial attachment		330
Total Time for Module III		990
TOTAL TIME FOR THE COURSE		2970

DIPLOMA IN AUTOMOTIVE ENGINEERING

MODULE I

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MODULE I

Introduction

This module is designed to enable the trainee acquire necessary knowledge, skills, attitudes and Competence that may be applied in the vehicle repair and maintenance works. The module gives emphasis in the study of vehicle technology. The module also designed to have knowledge and skills in life skills and the related general education subjects.

General Objectives

By the end of the module the trainee should be able to:

- a) understand the general engineering concepts
- b) appreciate the need for human factors in the work place
- c) understand vehicle technology
- d) perform vehicle maintenance
- e) apply acquired knowledge in ICT in research, net working and the understanding of vehicle technology
- f) observe safety regulations and standards when performing various tasks

Key Competence

By the end of the module, the trainee should be able to demonstrate ability to;

- a) apply information communication technology
- b) communicate effectively
- c) cope with challenges posed by their physiological, psychological, social and economic circumstances
- d) venture into profit making activities.
- e) Perform workshop processes
- f) Perform routine vehicle service

The units covered in this module are:

- 3.1.0 Communication Skills
- 4.1.0 Life Skills
- 5.1.0 Information And Communication Technology (ICT)
- 6.1.0 Entrepreneurship Education
- 7.1.0 Mathematics I
- 8.1.0 Mechanical Science
- 9.1.0 Electrical and Electronics Principles
- 10.1.0 Basic Engineering Drawing
- 11.1.0 Materials Technology and Metallurgy I
- 12.1.01.0 Workshop Technology
- 12.1.0 Vehicle Technology