

1.0 General Introduction

1.1 National Goals of 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 Craft Training Programmes

A Craftsman should have a thorough knowledge of the techniques and appropriate tools for his trade. In addition, the trainee should acquire a firm grounding in relevant Science and Technology so as to:

- a) understand the fundamental principles of the craft
- b) appreciate the materials handled in the craft
- c) adjust to changes in the nature of work caused by technological development
- d) extend the scope of understanding of the industry and society in which the craftsman works and lives.
- e) Prepare for advancement to the technician/diploma course.

2.0 Introduction to the Course

The Craft Course in Mechanical Engineering, Plant Option, is designed for Kenya Certificate of Secondary School Education (KCSE) graduates (or equivalent qualification), to provide trainees with knowledge, skills and attitudes necessary to perform and manage maintenance tasks in the field of Industrial Plant. The course is packaged in two modules and it covers industrial plant shop services, and industrial plant systems maintenance and service. In addition, life skills and Computer skills are integrated to enhance the trainee's competence for employment in the formal and the informal sector.

It is expected that the trainee will spend a lot of time in the workshop so that they can acquire the necessary skills through practical work to help them meet the needs of the industry.

Trainers are required to continuously research and acquaint themselves with emerging trends and issues in this field and integrate them in the teaching. Trainers are further required to take into considerations the interests of people with disability as prescribed in the persons with Disability Act.

At the end of each sub-module unit, a list of teaching/learning resources has been included. The list is not exhaustive and the trainers and trainees are encouraged to use other resources deemed relevant.

2.1 General Objectives of the Course

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

- a) interpret Industrial Plants drawings
- b) install an Industrial Plant system
- c) operate an Industrial Plant system
- d) repair faults in an Industrial Plant
- e) apply Information Communication Technology (ICT) in the Industry and in his/her day to day life
- f) apply entrepreneurial and life skills for self reliance
- g) demonstrate awareness in Occupational Safety and Health
- h) develop a firm foundation for further training

2.2 General Regulation

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

2.2.2 Duration of the Course

The course is designed to have 1980 hours. The trainee spends 1650 hours in the institution and 330 hours in industrial attachment undertaken after completion of the first module.

The course is structured in two modules as outlined below:

	Institutional Time (Hrs)	Industrial Attachment (Hrs)	Total Time (Hrs)
Module I	860	330	1190
Module II	790	-	790
Total	1650	330	1980

2.2.3 Entry Requirements

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

- a) passed the Kenya Certificate of Secondary Education (KCSE) with a minimum of D+ mean grade.

OR

- b) Equivalent qualification as shall be determined by the Kenya National Examinations Council (KNEC).

2.2.4 Examination Units

All the units in each module of the course are examinable. The examination shall include both theory and practical phase tests for the core competency areas as follows:

Code	Module Unit	Mode of Assessment
Module I: Plant Shop Services		
3.1.0	Entrepreneurship Education	Theory
4.1.0	Information Communication Technology	Theory and Practice
5.1.0	Mathematics I	Theory and Practice
6.1.0	Mechanical Science I	Theory and Practice
7.1.0	Technical Drawing I	Theory and Practice
8. 1.0	Electrical Principles & Instrumentation	Theory and Practice
9. 1.0	Workshop Technology & Practice	Theory and Practice
10. 1.0	Plant Maintenance & Safety	Theory and Practice
11. 1.0	Material Technology	Theory and Practice
Module Ii: Industrial Plant Systems		
12.2.0	Mathematics II	Theory
13. 2.0	Life Skills	Theory
14. 2.0	Communication Skills	Theory

15. 2.0	Mechanical Science II	Theory and Practice
16. 2.0	Plant Drawing	Theory and Practice
17. 2.0	Workshop Organization and Management	Theory
18. 2.0	Industrial Plant Technology	Theory and Practice
19. 2.0	Business Plan	Theory
20. 2.0	Trade project	Theory and Practice

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

2.3 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.

2.3.1 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.

2.3.2 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.

2.3.3 Compulsory Industrial Attachment/Internship for Trainees

Before the end of the course, every trainee shall undergo industrial attachment/internship of 330 hours, which shall be an integral part of the training. The industrial attachment shall be assessed and the marks attained 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.

2.3.4 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.

2.4 Examinations and Award of Certificates

2.4.1 Assessment

The assessment of all the modules shall be competency based.

2.4.2 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 of each module unit and keep these records for use at 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.

2.4.3 External Examinations

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

2.4.4 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.

2.4.5 Coursework/Continuous Assessment

Coursework/continuous Assessment will be prepared and marked by the institutions. The institutions will issue progress reports while the examining body will award a certificate after completion of the relevant modules.

2.4.6 Examination Results

In order to qualify for the award of craft certificate in Mechanical Engineering, Plant Option, 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).

2.4.7 Award of Certificate

The KNEC will issue the candidates with result slips for Modules passed and a final certificate in craft certificate in Mechanical Engineering, Plant Option.

2.4.8 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.

2.5 Course Coding and Time Allocation

Craft Certificate in Mechanical Engineering - Plant Option

Module I Plant Shop Services		
Code	Module unit	Time Hrs
3.1.0	Entrepreneurship Education	66
4.1.0	Information and Communication Technology (ICT)	99
5.1.0	Mathematics I	66
6.1.0	Mechanical Science I	66
7.1.0	Technical Drawing I	99
8.1.0	Electrical Principles & Instrumentation	66
9.1.0	Workshop Technology & Practice	100
10.1.0	Plant Maintenance & Safety	210
11.1.0	Materials Technology	88
Time for module I		860
Time for industrial attachment		330
Time for module I		1190

Module II Industrial Plant Systems		
12.2.0	Mathematics II	66
13.2.0	Communication Skills	66
14.2.0	Mechanical Science II	66
15.2.0	Plant Drawing	66
16.2.0	Workshop Organization and Management	44
17.2.0	Industrial Plant Technology	322
18.2.0	Business Plan	44
19.2.0	Trade Project	50
20.2.0	Life Skills	66
Time for module II		790
Total time for the Course		1980

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