



REPUBLIC OF KENYA

TECHNICAL, INDUSTRIAL, VOCATIONAL AND
ENTREPRENEURSHIP TRAINING

**CRAFT CERTIFICATE IN ELECTRICAL AND
ELECTRONIC TECHNOLOGY
TELECOMMUNICATION OPTION**

SYLLABUS AND REGULATIONS



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Off Murang'a Road

FEBRUARY 2009

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Foreword

The Technical Industrial Vocational and Entrepreneurship Training (TIVET) programmes have been revised to cater for new technology, issues and trends that have emerged since early '90s when the syllabi were developed under the Technical Education Project (TEP) programme. The review process has necessitated removal of outdated/irrelevant content. In addition, the content has been revised and new areas included to help the graduates of the programme acquire knowledge, practical skills, attitudes and competence relating to occupations in various sectors of economic and social life.

The syllabus is designed and organised to guide the trainer in the depth of teaching, with a clear outline of the general objectives, specific objectives, teaching/learning activities and suggested methods of evaluating the trainee's achievement.

The curriculum is modular and competency based allowing for trainees' exit to the world of work and easy re-entry to the course.

I am grateful to the staff of Kenya Institute of Education, subject and course panel members at the Kenya Institute of Education, the KIE academic board, the staff of the MoHEST and all those who participated in the development and the production of this syllabus.

Director Technical Education
Ministry of Higher Education Science and Technology

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

The general objectives of the craft 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 operate either as a craftsman or perform middle level supervisory functions.

2.0 Introduction to the Course

The Craft Certificate in Electrical and Electronic Technology Telecommunication option course is designed for Kenya Certificate of Education graduates (or equivalent qualifications), to provide trainees with skills, knowledge and attitudes for the installation, operation, service and maintenance of electrical installation systems and basic electronic equipment.

The course is in modular form and it is designed to enable trainees acquire adequate competence for formal and informal employment and also to prepare them for further training.

The course is in two modules. Each module prepares the trainee to perform specific tasks whose total value combined will impart the desired competence to the trainees, to produce the required graduate at the end of the course.

The course puts emphasis on practical work and competence acquisition. Thus the trainee is required to spend 20 % of the total hours on theory and 80 % 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, taking into considerations the interests of persons with disability in each lesson, as prescribed in the Persons with Disability Act of 2003.

2.2 General Objectives of the Course

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

- a) demonstrate positive attitudes towards self employment
- b) communicate effectively in matters of electrical and telecommunication engineering at his/her level
- c) observe environmental, health and safety regulations and requirements and codes of practice and standards when working
- d) install service and maintain data communication equipment
- e) use scientific and mathematical concepts to solve electrical problems
- f) appreciate the role of management in the telecommunication field

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 1980 hours. 1650 hours shall be spent in the training institutions while 330 hours shall be spent on Industrial Attachment. The course duration shall be as outlined below.

	Institution Time (Hours)	Industrial Attachment Time (Hours)	Total Time (Hours)
Module I	825		825
Module II	825	330	1155
Total	1650	330	1980

2.3.3 Entry Requirements

Trainees entering this course should have any of the following as the minimum entry requirement:

- a) Passed Artisan course in Electrical Installation

OR

- b) Passed Kenya Certificate of Secondary Education (KCSE) with an Mean grade of D (D plain)

OR

- c) Passed National Vocational Certificate of Education and Training (NVCET) in Electrical and Electronic Technology Option II

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

Module I		Suggested mode of assessment
3.1.0	Entrepreneurship Education	Theory
5.1.0	Course Foundations and General Information	Theory
6.1.0	Technical Drawing	Practice
7.1.0	Mathematics I	Theory
8.1.0	Applied Science	Theory and practice
9.1.0	Workshop Technology	Theory and practice
10.1.0	Electrical Principles I	Theory and practice
11.1.0	Electronics	Theory and practice
12.1.0	Electrical Installations Technology I	Theory and practice
13.1.0	Solar Installation Systems	Theory and practice
Module II		
14.2.0	Life Skills	
15.2.0	Electrical Principles II	Theory and practice
16.2.0	Communication Skills	Theory and practice
17.2.0	Workshop Organisation and Management	Theory
18.2.0	Mathematics II	Theory
19.2.0	Micro Electronics	Theory and practice
20.2.0	Radio Systems	Theory and practice
21.2.0	Television Fundamentals	Theory and practice
22.2.0	Data Communication	Theory and practice
23.2.0	Instruments and Electronic Fault Diagnosis	Theory and practice
24.2.0	Business Plan	Practice
25.2.0	Trade Project	Practice

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

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 330 hours. 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 at the end of each module 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.

2.5.3 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 **Craft certificate in Electrical and electronic Technology, Telecommunication 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).

2.5.7 Award of Certificate

The KNEC will issue the candidates with result slips for Modules passed and a final certificate in **Craft certificate in Electrical and electronic Technology, Telecommunication Option**

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

Craft certificate in Electrical and electronic Technology, Telecommunication Option

	Module Units	Time Hrs
Module I		
3.1.0	Entrepreneurship Education	66
4.1.0	Information and Communication Technology (ICT)	100
5.1.0	Course Foundations and General Information	36
6.1.0	Technical Drawing	55
7.10	Mathematics	44
8.1.0	Applied Science	68
9.1.0	Workshop Technology	55
10.1.0	Electrical Principles I	88
11.1.0	Electronics	99
12.1.0	Electrical Installation I	170
13.1.0	Solar Installation Systems	44
Total Time for Module I		825
ModuleII		
14.2.0	Life Skills	66
15.2.0	Electrical Principles II	99
16.2.0	Communication Skills	66
17.2.0	Workshop Organisation And Management	44
18.2.0	Mathematics II	66
19.2.0	Micro Electronics	55
20.2.0	Radio Systems	104
21.2.0	Television Fundamentals	77
22.2.0	Data Communication	66
23.2.0	Instruments and Electronic Fault Diagnosis	88
24.2.0	Business Plan	44
25.2.0	Trade Project	50
Total Time for Module II		825
Industrial Attachment		330
Total Time for the Course		1980