

# 第三国集团研修事前調査団報告書

## —ケニア・応用電気電子工学技術—

1993年10月

国際協力事業団  
研修事業部

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第三国集团研修事前調査団報告書  
—ケニア・応用電気電子工学技術—

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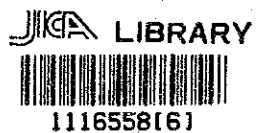
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1993年10月

国際協力事業団  
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26895

## 序 文

第三国研修とは、我が国が発展途上国に移転した技術を、その発展途上国を通じて周辺国に移転・普及させる日本の技術協力の一形態である。我が国の技術的・資金的支援を得て、発展途上国自身が、自国の研修実施機関で周辺国から人を受入れ研修を行うものである。

我が国の第三国研修による協力は、昭和49年度にタイのコラート養蚕訓練センターにおけるラオス研修員の受入れに対して初めて実施されて以来、協力実施要請の増加を受け、平成4年度には、23か国で69コースを実施するに至っている。

一方、ケニアにおける第三国研修としては、初めて実施された「デジタル・マイクロウェーブ」(平成3年度終了)に続き、平成4年度よりジョモケニヤッタ農工大学における「応用食品分析」が5ヶ年の予定で実施されている。同大学は、1980年以来の長期にわたり、我が国が技術協力・無償資金協力を実施しており、「応用食品分析」の実績からも、第三国研修の実施能力が認められている。かかる状況から、ケニア国政府は、我が国に、ジョモケニヤッタ農工大学での新規第三国研修「応用電気電子工学技術」の協力を要請してきた。

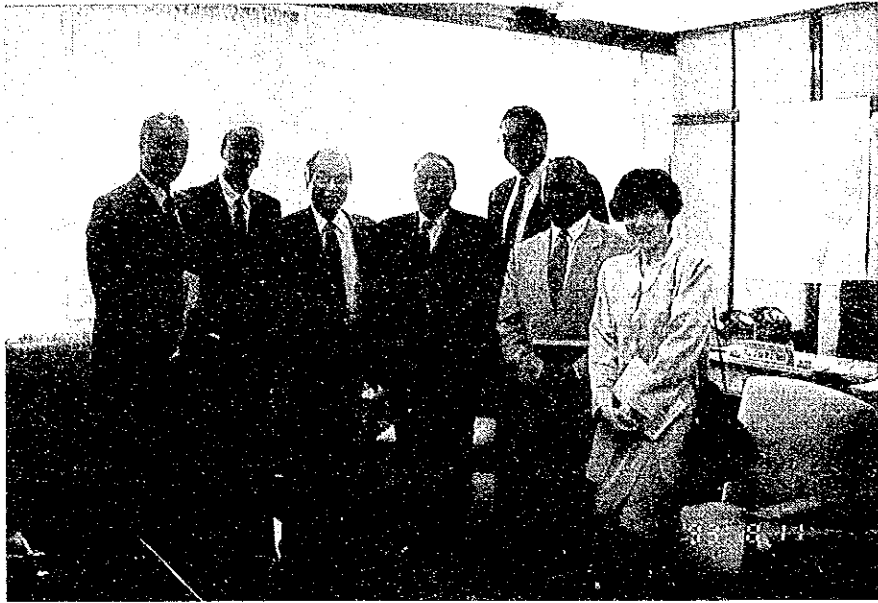
これに基づき、事前調査のため、平成5年8月10日から8月17日までケニア国に調査団を派遣した。本報告書はその結果及び協議内容を取りまとめたものである。

本件調査の実施にあたり、並々ならぬご協力を賜った外務省、文部省、琉球大学及び在ケニア日本大使館、その他関連諸機関に対し、深甚な謝意を表す次第である。

平成5年10月

国際協力事業団  
研修事業部長 庵原 宏義





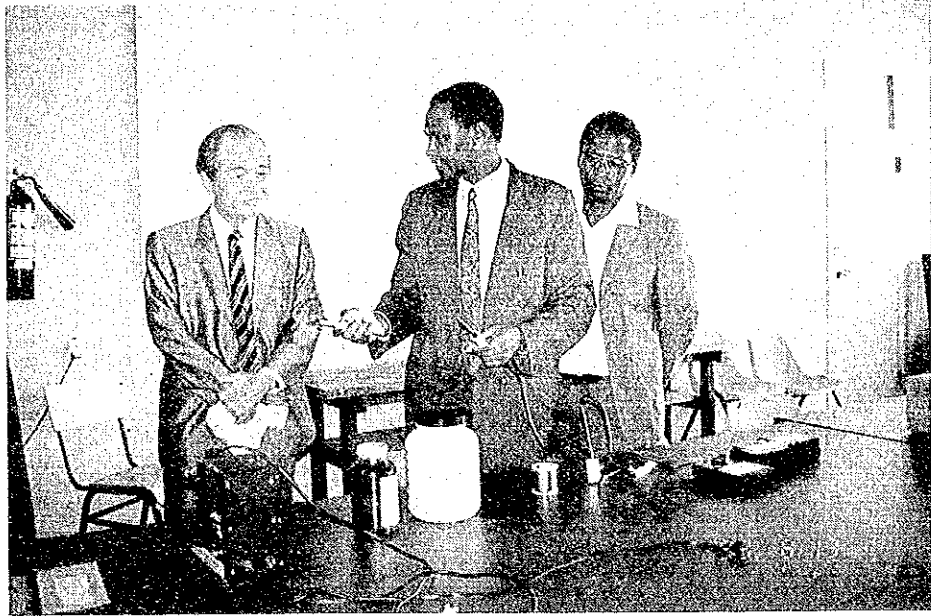
▲教育省表敬



▲ジョモケニヤッタ農工大学における協議







▲電気電子工学科実験室



▲ミニッツに署名する喜屋武団長と  
Michieka学長



## LOCATION OF JKUCAT

Site Location : Juja, Kiambu District, Republic of Kenya

Site Area : 2,058,000 m<sup>2</sup>

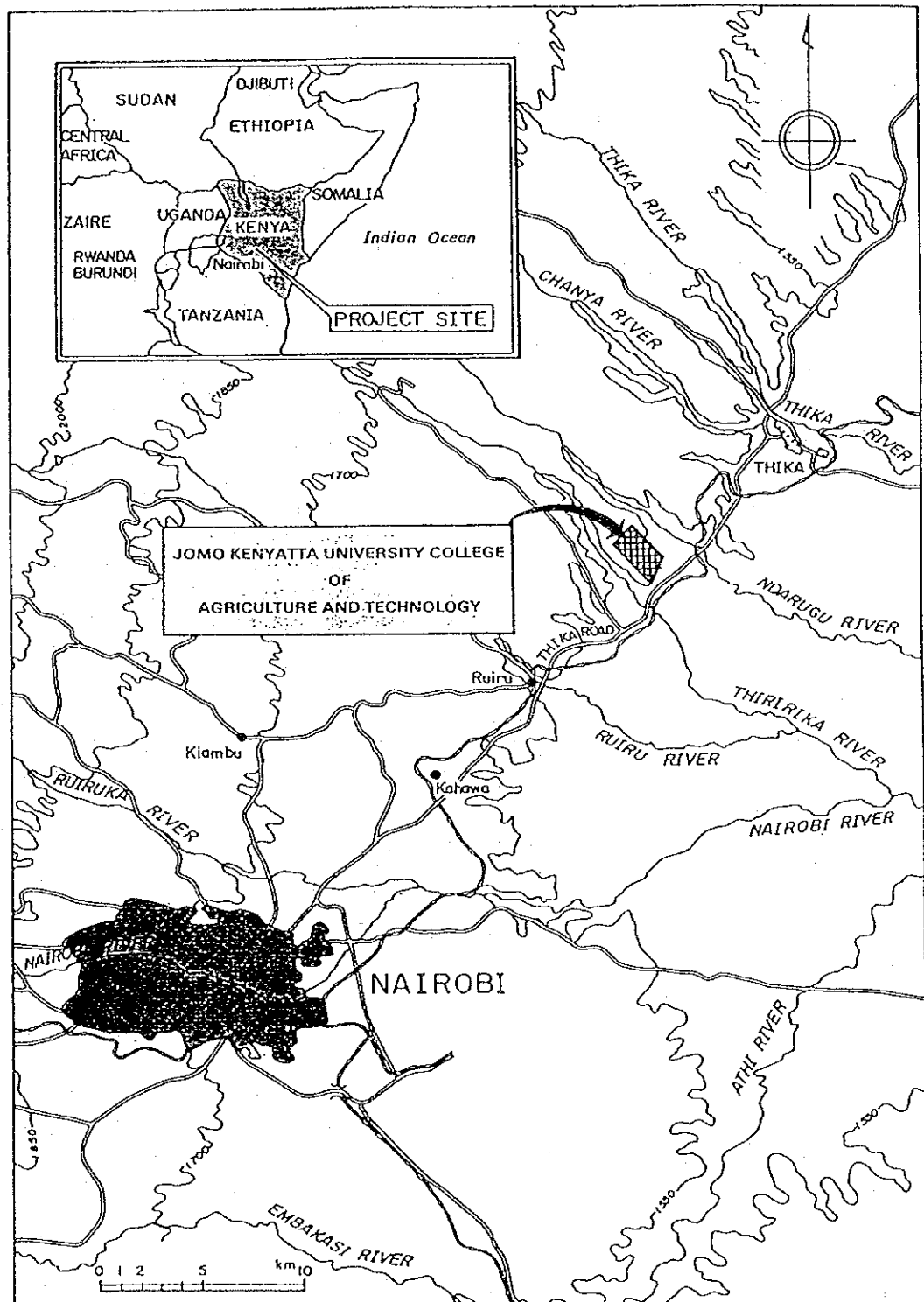
Telephone : 0151-22646, 22647, 22648, 22649 (JKUCAT)

0151-21847 (Project Office)

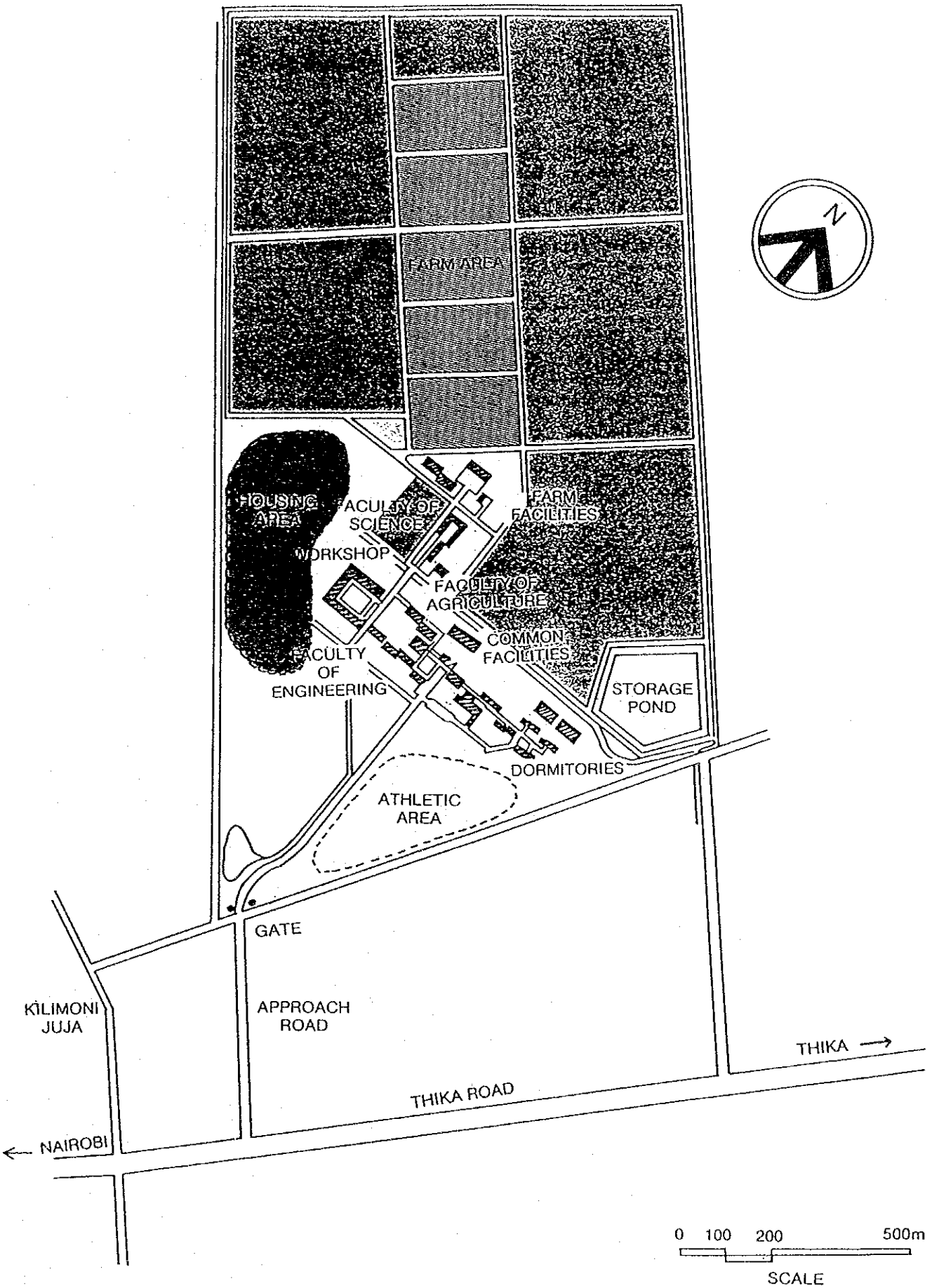
Fax : 0151-21764 (JKUCAT)

For international Call : 254 (Country Code), 151 (Area Code)

Letter : P.O. Box 62000, Nairobi, Kenya









## 要 約

平成5年（1993年8月）、ケニア国政府は、応用電気電子分野の第三国研修の実施を我が国に要請越した。

これを受けて、国際協力事業団は、同年8月10日から8月17日までケニア国に事前調査団を派遣し、「ケ」国側要請の背景・内容及び研修実施体制の確認を行うとともに、第三国集団研修の実施基本方針の策定を行った。

ケニア国側関係機関と事前調査団の協議内容はミニッツに取り纏められ、8月16日に喜屋武団長とジョモケニヤッタ農工大学ミチエカ学長との間で署名交換された。





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## 1. 事前調査団の派遣

### 1-1 派遣の経緯と目的

ケニアを始めとしたサハラ以南のアフリカ諸国の多くは、その独立以来、農業依存型の産業構造からの脱却を図るべく、産業の多角化に向けての模索が続いている。また、都市を中心とした人口増加に伴う失業率は増加する一方であり、労働市場の3分の2は、いわゆるインフォーマル・セクターにあるとされている（Economic Survey, Rep. of Kenya, 1993）。

かかる状況の下、中小企業育成は、社会経済発展に向けた各国共通の課題であり、産業とそれを支える経済・社会基盤の整備・管理能力の向上に結びつく技術の普及が求められている。今般、第三国研修の研修科目として取り上げられた電気電子工学技術は、その技術普及へのニーズが特に高いと判断されたものである。

一方、本第三国研修の実施機関となるジョモケニヤッタ農工大学（JKUCAT）は、1980年より、日本政府によるプロジェクト・タイプ技術協力のもと、農学、工学分野における技術系ディプロマ大学に向けて発展してきた。1990年には学士教育の大学へと昇格し、技術系大学としての信頼を高めている。1992年には、長期間にわたって培われた技術を周辺国へ移転すべく、食品ポストハーベスト学科を中心に、応用食品分析の分野で第三国研修が実施されるに至っている。

同学電気電子工学科についても、1981年の開学当初より、我が国からの供与機材を活用することにより、実技に重点をおいた技術教育を実施してきた。同学科への専門家派遣、カウンターパート研修の実施により、その教官の資質向上も目覚ましく、電気電子工学分野においてはケニアにおける先進的教育研究の場となっている。

JKUCATにおける上述実績およびケニアをはじめとした周辺国の産業政策における電気電子工学技術の重要性を踏まえ、サハラ以南アフリカ諸国を対象とした同分野における第三国研修の実施に係る協力要請がなされたものである（平成5年8月17日付第850号）。

本調査団は、上記要請を受け、本件実施機関であるJKUCATにおける第三国研修の実施可能性を調査するとともに、研修計画をケニア国関係者と協議することを目的として派遣された。

1-2 調査団の構成

団長（総括）

喜屋武 盛基 琉球大学工学部長

（JKUCAT国内支援委員）

団員（研修計画及び運営）

細井 なな

JICA研修事業部研修第三課

1-3 調査日程

月 日	曜日	調査行程	調査内容
8月10日	火	事務所・大使館 巡回指導調査団	調査目的の説明、第三国研修概要説明等 カジェ外、国内支援委員会内でのコンセンサス調整
11日	水	人 事 院 教 育 省 大 蔵 省 JKUCAT協議	調査目的の説明、第三国研修概要説明等 調査目的の説明、協力体制について等 調査目的の説明、第三国研修概要説明等 第三国研修「応用食品分析」実施報告
12日	木	JKUCAT協議	要請背景、周辺国のニーズ、実施対象国の選定、 実施予算額、カリキュラム、実施体制についての協議
13日	金	JKUCAT協議	ミッツ案及びR/D案作成・見直し、派遣専門家・ 実施準備体制についての協議
16日	月	JKUCAT協議	ミッツ署名
17日	火	事務所・大使館	調査結果報告

1-4 主要面談者

氏 名	役 職、所 属 機 関
1. 佐藤 ギン子	在ケニア日本大使
2. 堀江 正彦	在ケニア日本大使館 公使参事官
3. 阪井 清志	在ケニア日本大使館 一等書記官
4. Mr. W. Wamuricho	Dep. Director, Dir. of Personnel Management
5. Mr. J. A. O. Ndisi	Senior Ass. Director, //
6. Prof. J. M. Waithaka	Director of Education, Min. of Education
7. Mr. S. P. M. Kyungu	Deputy Director, //
8. Mr. I. M. Farah	Deputy Secretary, //

9. Mr. P. S. Muthui	Deputy Chief Economist, //
10. Mr. J. L. Lavuna	Undersecretary, Ministry of Finance
11. Prof. R. W. Michieka	Principal, JKUCAT
12. Prof. H. M. Thairu	Deputy Principal, Academic Affairs, JKUCAT
13. Dr. R. M. Mutua	// , Research, Production & Extension, //
14. Prof. S. M. Maranga	Dean, Faculty of Engineering, //
15. Mr. M. S. Mbogho	Chairman, Dept. of E & E Engineering, //

## 2. 要請の背景

### 2-1 周辺国のニーズ

第三国研修「応用電気電子工学技術」を立案するに当たり、電気電子工学科にて、以下のとおりアンケート調査を行った結果、周辺国における当該分野のニーズの高さが確認できた。

#### (1) アンケートの実施

申請中の研修案について、研修割当国として想定される南部、中央部、及び東部アフリカの英語圏15か国の当該分野の技術者を有する関連60機関へ、研修プログラムと共にアンケートを送付した。アンケートは主に、その機関の活動内容、職員の専門分野及び学歴、受講希望者数、必要とされる研修内容、プログラムに対する意見等を求めた。

#### (2) 全般的な反応

附属資料2のAPPENDIX 2にアンケートの集計結果の解析を示す。アンケートの回答は10か国23機関からあった。全般反応としては、この研修プログラムは大変歓迎され、電気電子工学科としては、この研修の必要性の確認ができた。またそれぞれの機関から寄せられた建設的な意見については、研修プログラムの中で反映されるよう検討中である。

#### (3) アンケート結果の分析

以下に、アンケート結果の要点をまとめる。

① 23機関の内訳は、民間会社2、大学6、半官半民の機関4、政府部局2、研

究機関 4、その他 5 であった。

②これらの機関が携わっている分野は、研究 15、教育・研修 13、設計・制作 12、生産 6、その他 3 であった。

③その中で、特に電気電子工学に関係のある 16 機関の業務内訳は次のとおりであった。

電子回路の設計・制作	15
簡単な電気工学の教具の設計・制作	14
国のエネルギー資源の管理	7
地域の状況に適した技術の開発	17
ハイテク技術の国家経済に及ぼす影響等の評価・査定	10

(4) 上記分野に携わる職員 736 人の内、約 50% のお 366 人が学士以上の学歴を有している。

(5) アンケートに回答した 23 機関の全てと、736 人中約 60% の 405 人が提案されているコースは有益であるとしている。

(6) 当該コースに対する追加、もしくは変更の提案が 7 件あり、分野は次のとおりであった。

①電気機器等の修理・保守

②企業家の訓練

③生物医学工学

④電気機器の制御回路設計（プログラマブル論理回路、プロセス制御等）

(7) 当該コースの期間が不相当とする意見（9）があり、それらは適正期間として 6～8 週間を提案していた。

(8) 当該コースに関して肯定的意見は 18 件、否定的意見は 2 件、回答無しは 3 件であった。

## 2-2 実施国の当該分野の現状

JKUCAT は、その創設以来、ケニア人関係者たちのたゆまない努力と日本による援助により、当初ディプロマ・コースだけのものから、げんざいでは、学士号コースを持つまでに成長した。その間、教官の学位取得や研修による資質向上は目覚ましく、電気電子工学においてはケニアにおける先進的教育研究の場となっている。提案

されている第三国研修プログラム「応用電気電子工学技術」のカリキュラムは、当該大学において実施してきた経験上の成果によるものであり、周辺諸国が十分に利益を受けられる内容となっている。

ケニアの工業の現状は、先進工業国と比較すると、まだ揺籃期にも至っていないと考えられる。例えば、ナイロビ市内にある工業団地的区域における製品（鍋、釜、包丁等日用品）の製造などは全て手作業で、ドラム缶から切り出した鉄板をハンマーで叩いて鍋の形に打ち出すという原始的加工法を採っていた。安い労働賃金と非常に高価なプレス機械のような輸入品の関係で、この様な方法がもっとも現地に合っているのかもしれないが、それでは何時までも進歩しない。労働作業の効率化、機械化が必要とされる。

応用電気電子工学の分野においても状況は同じで、電気製品の製造は見るべきものが殆ど無と言って良い。町で見かけたケニア製らしきものとしては、貝細工品を電気スタンドにした仕上がりも粗末なものであった。

このような現状にもかかわらず、ケニアは周辺諸国と比べると人的資源や教育レベルにおいて優位に立っている。この優位性と、日本がこれまで援助し、成果を上げてきたJKUCATの実力と、それと、何よりも彼らから感じ取られる熱意とで有効な第三国研修プログラムの実施が可能になると考えられる。

### 3. 要請の内容（第三国研修基本計画）

本件基本計画は、ケニア側より提示された要請をもとに、調査団及びJKUCAT間で協議を行い、M/U（DRAFT）にとりまとめたものである。

#### 3-1 コース名

コース名は、ケニア側の要望を踏まえ、以下の名称とする。

和文：応用電気電子工学技術

英文：Applied Electrical and Electronic Engineering Technology

#### 3-2 目的

英語圏アフリカ諸国の参加国からの研修員に対し、応用電気電子工学分野における知識技術を向上させる機会を提供することを目的とする。

### 3-3 到達目標

本研修の参加者は、研修終了時に以下の技術・知識を改善し、向上していることが期待される。

- (1) 電気電子工学に関する知識および技術全般
- (2) 電子回路の設計、制作
- (3) 各地域の事情に適した電気電子分野における適正技術

### 3-4 時期・期間

協力期間は、1993年度年から1998年度までの5年間とする。

研修期間は毎年30日間とし、初年度研修は、1994年2月～3月に実施する。

### 3-5 割当国

ボツワナ、エチオピア、レソト、マラウィ、ナミビア、スワジランド、タンザニア、ウガンダ、ザンビア、ジンバブエ（以上10ヶ国）

### 3-6 定員

15名とする。ただし実施国からの参加は2名を越えないものとする。

### 3-7 カリキュラム

電子回路の設計、プリント基盤の制作を中心とした以下の項目を取り扱うものとする。

- (1) カントリーレポートの発表
- (2) 電源回路
- (3) 信号回路
- (4) プリント基盤の手作業による制作
- (5) プリント基盤におけるコンピューターの援用

### 3-8 実施場所

JKUCAT (ジョモケニヤッタ農工大学)



### 3-9 応募資格

- (1) 各国政府から推薦された者
- (2) 電気電子工学または関連分野のディプロマ、または学士を有し、5年以上の経験を有する者
- (3) 応募時に40歳以下の者
- (4) 心身ともに健康な者

### 3-10 募集手続

- (1) 各国政府は、研修開始60日前までにケニア国政府に要請書を送付する。
- (2) ケニア国政府は、研修開始30日前までに受入回答を各国政府宛に通報する。

### 3-11 ケニア教育省、JKUCAT、日本政府それぞれの分担事項

#### ケニア教育省

- (1) 割当国政府へのG. I. 送付
- (2) 要請書の受領及びJKUCATへの送付
- (3) 選考結果の各国政府及への通報

#### JKUCAT

- (1) カリキュラムの作成
- (2) G. I. の作成・印刷
- (3) 研修実施に必要なスタッフの配置
- (4) 研修施設・機器の提供
- (5) 研修員の選考とケニア教育省及びJICAケニア事務所への結果通報
- (6) 研修員宿泊施設の手配
- (7) 航空券の手配、空港送迎
- (8) 研修旅行に関する手配
- (9) 日本側負担分を除く必要経費に対する予算措置
- (10) 修了証書の発給
- (11) JICAエジプト事務所への実施報告書及び精算報告書の提出（研修修了後30日以内）
- (12) その他の研修に関する諸問題の調整

日本政府

(1) 短期専門家の派遣

(2) 経費の負担

- ① 周辺国からの研修員の国際航空賃、宿泊・日当及び保険代
- ② 外部講師謝金（必要な場合）、開閉講式代、研修旅費、教材費、事務費

### 3-12 経費の授受手続

日本政府から支払われる経費の送金及び支出は、以下の手続に従い行うこととする。

- (1) JKUCATは、銀行口座を新設し、それをJICAケニア事務所に通報する。
- (2) JKUCATは、研修開始の60日前に経費の見積書をJICAケニア事務所に提出する。
- (3) JICAは、見積書受領後30日以内に査定し、送金する。
- (4) JKUCATは、研修修了後30日以内に精算書をJICAケニア事務所に提出する。
- (5) 経費で残金が生じた場合、JKUCATは、JICAの規定に基づき残金を返納する。航空賃、宿泊・日当は、他の目的のためには使用できない。
- (6) JICAの要求に基づき、公共事業省はJICAからの照会があった場合のために、上記3-12(4)の支出を証明するすべての領収書及び証拠書類を保管しておく。

## 4. 第三国研修実施体制

### 4-1 実施機関の組織及び事業概要

ジョモケニヤッタ農工大学（Jomo Kenyatta University College of Agriculture and Technology、JKUCAT）は、ケニア国の経済・社会発展に寄与する技術者を身につけた中堅技術者の育成を目的として、我が国の無償、技術協力を経て1981年5月にディプロマ・コースを提供する高等教育機関として設立された。

ケニア国においては、国造りに寄与すべく技術者の不足が独立以来の懸案事項として指摘され、第3次国家開発5カ年計画においては、その解決策として、職業技能訓練に重点を置いた教育制度の確立が重要な施策の一つとして掲げられた。JKUCAT設立の協力要請は、係る政策上の課題を背景に、1977年に日本が受けたものである。その後、今日に至るまでプロジェクト方式技術協力が続けられ、1990年には、ケニヤッタ大学の一部を成すカレッジに昇格、学士課程を開設し、現在に至る。

JKUCATは、現在では、農学部（園芸学科・農業工学科・食品科学ポストハーベスト科）、工学部（土木工学科・建築学科・機械工学科・電気電子工学科）及び理学部（物理学科・生物学科・数学コンピューター学科）の3学部で構成されている。これらの学部に対する過去10年間の我が国の技術移転の成果の現れの一つとして、周辺国への技術移転の普及を目的とした第三国研修が、農学部食品科学ポストハーベスト科において、1992年度より開始されている。

一方、工学部電気電子工学科は、大学設立当初より、電気電子工学分野における人材育成機関の先駆者的存在を果たし、1985年に最初の卒業生を輩出して以来、国内市場に多数の技術者を送り続けている。設備面においても、我が国からの機材供与により、域内において最も設備の充実した実践重視の教育機関として、その地位を確立してきた。主要設備としては、①電気機械研究室、②高電圧及び、電力研究室、③通信研究室、④制御・測定研究室、⑤電子研究室、⑥イルミネーション研究室、⑦基礎電気工学研究室、⑧組み立て作業室等がある。1990年以降は、同学部も学士課程コースを開設し、現在では3カ年のディプロマ・コース、5カ年の学士課程に年間約60名の学生を受け入れている（表1）。

表1： 電気電子工学科における入学者数

(単位：人)

年度	入学者数（3年ディプロマ・コース）	入学者数（5年学士課程）
1981	25	N. E.
1982	26	N. E.
1983	27	N. E.
1984	29	N. E.
1985	28	N. E.
1986	29	N. E.
1987	30	N. E.
1988	30	N. E.
1989	31	N. E.
1990	34	31
1991	31	30
1992	N. E.	N. E.
1993	33	25

#### 4-2 実施機関の関連組織及びその支援体制

第三国研修を実施するにあたっては、JKUCATの管轄省である教育省（Ministry of Education）が外交的窓口となり、本研修の周辺国への募集の働きかけ及び応募の受付を担当する。また、我が国が負担しない経費についての財政面での協力体制は、財務省（Ministry of Finance）に依頼はしているものの、ケニア国政府の現在の財政状況においては、具体的な協力は困難である。しかしながら、両省とも本第三国研修の主旨、意義については理解と歓迎の意を表しており、本研修実施に当たり、周囲の環境は整っているものと判断される。

#### 4-3 実施機関の研修指導能力及び研修運営能力

ケニア国における電気電子工学技術の重要性は、電気・通信分野を中心とした社会経済インフラの根幹を支える技術として認識されている。特に、電気・通信設備関連機器の大部分を輸入に依存している現状では、輸入代替のための自国生産を目指すこともさることながら、既存の設備、機材の日常の修理・保守技術の普及は社会経済活動の安定のためには急務とされてきた。当該実施機関は、係る社会的要請を念頭に、実践中心のカリキュラムのもとで10年以上の教育訓練の実績を持ち（表1）、また当該において着実な研究成果、セミナー実績を挙げている（表2）。

表 2 : 電気電子工学科における 92 年度研究成果 (単位: 件)

活動内容	成 果
研 究 活 動	半導体接触、コンピューター支援制御工学教育、太陽エネルギー利用、アクティブ・フィルタ (予定)
論文掲載出版	JEEES セミナー、IEEE、AFRICOAN' 92、KENYA NATIONAL ASSOCIATION OF PHYSICS (KNAP)、他
学会・セミナー	IEEE、AFRICOAN' 92、KNAP、学科セミナー、JEEES、土木工学セミナー

かかる実績のもとで当該第三国研修では、対象国のニーズに適合した発展性を有した研修内容を検討しており、主要カリキュラムとしては、以下のとおりである。

- ①ケニアや周辺諸国に共通な供給電力の不安定性 (日常的に起きる電源電圧の変動や停電) に対応できるように、電源回路 (電圧の変動を抑える) 安定化電源装置および (停電に備える) 無停電化電源装置などの原理と設計を行い、その回路をトリップ・ボード上に作り、調整・試験等により設計の有効性を確かめる。
- ②通信工学分野で使われる能動的フィルタ (抵抗器、コンデンサー、コイル等の電源を含まない受動的素子 (passive elements) を使って構成する受動的フィルタ (passive filter) に対して IC 等電源回路を含む能動的素子 (active elements) を使って構成するフィルタ)、テレコム関連の装置、測定装置、制御関連装置などの講義、回路設計、ストリップ・ボード上での制作・調整・試験により設計の有効性を確かめる。
- ③プリント基盤 PCB (printed circuit board) の制作は、先進工業国で行っているようなコンピューター援用設計・製造 (CAD/CAM) の中のそれではなく手作業でレイアウトを書きエッチングを行う方法で、研究所や学校の装置などに向いているもの。
- ④③の方法で作成したのと同じ回路をパソコン CAD を使って設計し、手作業で作ったレイアウトと比較検討し、コンピューター援用の有効性を確認する。

教官総勢 23 名の学位取得状況については、PhD 2 名、MSc 14 名、BSc 7 名であり、そのうち当該研修指導陣の中核を担うものは表 3 の通りである。

1. RESOURCE PERSONS  
1.1 Academic Staff under University Council

No	NAME	AGE	QUALIFICATIONS	DESIGNATION	SPECIALITIES	SUBJECTS ABLE TO COVER IN SYLLABUS FOR B.Sc.	Year/Date of Appointment
1	M.S. Nbogho	23/3/49	44 M.Sc. (USSR)	S.L./ C.O.D.	Power system, Electrical Machine	Electrical Machine, Power systems	13/12/1990
2	Dr. D. Murage	20/2/52	41 Ph.D. (USSR)	S.L.	Power Electronics	Power systems	3/ 8/1992
3	Dr. S.H. Kangeetho	29/9/54	38 Ph.D. (UK)	S.L.	Power Electronics, Machine Control	Control Eng., Elect. Measurements	31/12 1990
4	P.K. Mingo	15/6/53	40 M.Sc. (UK) ( C/P, Tokushima )	L.	Power Electronics	Power Electronics, Machine Cont.	3/ 9/1990
5	D. Ogaba	3/ 7/52	40 B.Sc. (UGANDA) M.Sc. (UK)	L.	Power Electronics	Analogue Electro., Circuit Theory	3/ 9/1990
6	E.N. Ndung'u	27/10/57	35 M.Sc. (JAPAN, Tottori)	L. (1992, Apr)	Electrical Filters	Electrical Filter, Digital Filter	1/11/1990
7	D.O. Konditi	22/ 7/50	42 M.Sc. (JAPAN, Tottori)	L.	Electromagnetism, Telecommunications	Electromagnetism, Telecommunicat.	1/ 4/1992
8	P.K. Kihato	16/12/59	33 M.Sc. (JAPAN, Tottori)	A.L.	Power Electronics, Electrical Mach.	Power Electronics, Machine Drive	29/ 4/1992
9	H.O. Absalom	23/ 1/55	28 B.Sc. M.Eng. (AUSTRALIA)	A.L.	Communication	Telecommunication	19/10/1992

1. 2. TECHNICAL STAFF

No	NAME	AGE	QUALIFICATION	DESIGNATION	Special Field	Laboratory	TRAINING EXPERIENCE	Date of Emp.
1	E. W. Kwangi	12/1949	43 IND 1979	chief Technician	T.V.	Illumination	JICA C/P ( KYOTO UNIV.)	1/ 4/1992
2	J. M. Kwangi	2/12/1949	43 Part II	T. On training leave	Installation	High Voltage	JICA C/P (TOTTORI UNIV.)	1/ 7/1984
3	H. Osieli	16/ 4/1966	27 Part III	T.	Electrical	Microprocessor	JICA C/P Tottori University	1/12/1989
4	A.N. Okioma	11/ 2/1967	26 Part III, IND 1992	T. (14/6/1992 employed)	Machines	Control		1/12/1989
5	Isac Kjeru Ireri	2/ 1/1959	34 Higher Diploma	T. ( 1/1/1993 employed)	Machines	Electrical Machines		12/ 1/1993

なお、研修運営能力については、JKUCAT食品ポストハベスト学科において、前年度より、第三国研修を実施しており、実施機関としての運営経験は積んでおり、問題はないものと判断される。

#### 4-4 研修機関の施設、建物、機材等

30日間の研修のうち、研修旅行を除いた大半の部分は研修実施機関であるJKUCATの電気電子工学科棟でじっしされることとなるが、その他に利用を予定している施設、機材は以下のとおりである。

##### ①施設

講義室：共通講義棟等に合計17室（24～200名収容可能）

実験室：電気電子工学科に10室

図書館：研修員閲覧可能

コンピューター室：NECパソコンおよびCADソフトが2セット

食堂・売店：研修員利用可能

診療室：研修員利用可能

宿舎：構内に学生寮として6棟480室あり、本第三国研修実施中は休み中であるため、研修員の利用が可能

##### ②機材

コンピュータ、及びソフトウェア

PCB設計機材

検査、測定装置

#### 4-5 第三国研修の実行予算

7-2のとおり、総額100、390US\$で合意した。

### 5. 日本の他の技術協力との関係

#### 5-1 無償資金協力

1977年に新大学設立の構想がまとまり、ケニア国より日本国に対し協力要請が出されたことを受け、1978年度より開始された無償資金協力の総額は、92年度

末までに90.79億円。

## 5-2 技術協力

1978年から開始された無償資金協力により、校舎等の設備が整備されたことを受け、1980年4月よりプロジェクト方式技術協力がディプロマ教育の分野で始まった。1988年9月にカレッジから、ケニヤッタ大学の分校であるユニバーシティ・カレッジに昇格したことを受け、1990年より大学学士課程への協力が新規に開始され、現在90年から5か年の計画で継続中である。

また、1993年1月から5か年計画で、食品ポストハーベスト学科を中心として実施されている第三国研修「応用食品分析」に対し、技術的・資金的支援が実施されている。

## 5-3 その他

国内支援委員会は1991年2月に設置されている。

## 6. 日本側の協力

### 6-1 協力の目的と必要性

第三国研修とは、我が国が発展途上国に移転した技術を、その発展途上国を通じて周辺国に移転・普及させる日本の技術協力の一形態である。JKUCATは、我が国の長年にわたる無償資金協力・技術協力の結果、域内有数の農工大学としての地位を確立し、その物理的・知的資源は、農業・工業分野における社会経済ニーズに応えうる水準に達している。元来、大学とは、社会の要請に必要な技術・知識の普及、向上を果たすことが使命であるが、発展途上国の多くにおいては、財政難から、その機能を十分に発揮できずにいるのが現実である。係る状況に鑑み、第三国研修の協力を実施することにより、



## 6-2 経費分担

今回の調査で日本側が負担する経費につき、先方より暫定的な見積書の提示があり、双方協議の結果、以下のとおりM/U(案)にまとめられた。

受入諸費:	36,600	US\$
研修諸費:	63,790	US\$
合計:	100,390	US\$

## 6-3 派遣専門家

初回については必要がないことを確認し、翌年度以降については、必要に応じ専門家派遣を検討することで双方了解した。

## 6-4 カウンターパート受入

カウンターパートについては、プロジェクトで対応することとする。



## 付 属 資 料

調査ミニッツ

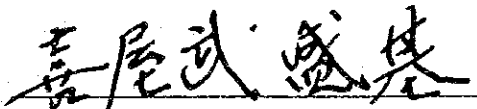
JKUCAT側マスタープラン



THE MINUTES OF MEETING  
BETWEEN  
THE JAPANESE PRELIMINARY SURVEY TEAM AND  
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF  
THE REPUBLIC OF KENYA  
ON  
THE THIRD-COUNTRY TRAINING PROGRAMME

1. The Japanese Preliminary Survey Team, organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Prof. Seiki KYAN, visited the Republic of Kenya from August 10<sup>th</sup> to August 18<sup>th</sup>, 1993 in order to discuss with the authorities concerned of the Republic of Kenya a training course for participants from African countries in the field of applied electrical and electronic engineering technology to be implemented in the Republic of Kenya under JICA's Third Country Training Programme.
2. The team conducted surveys, held a series of meetings and exchanged opinions with the authorities concerned of the Republic of Kenya regarding the course.
3. Both sides came to share the view that the course will contribute to the development of applied electrical and electronic engineering technology in African countries.
4. Both sides drafted the Record of Discussions attached as Appendix I, and agreed to recommend to their respective Governments that further studies should be made for elaborating it in order to ensure the successful implementation of the course.
5. A list of attendants at the meeting is attached as Appendix II.

Nairobi, August 16, 1993



Prof. Seiki KYAN  
HEAD OF THE JAPANESE  
PRELIMINARY SURVEY TEAM  
JAPAN INTERNATIONAL  
COOPERATION AGENCY (JICA)



Prof. Ratemo W. MICHIEKA  
PRINCIPAL  
JOMO KENYATTA UNIVERSITY  
COLLEGE OF AGRICULTURE AND  
TECHNOLOGY (JKUCAT)

THE RECORD OF DISCUSSIONS  
BETWEEN  
THE RESIDENT REPRESENTATIVE OF JICA KENYA OFFICE AND  
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF  
KENYA ON THE THIRD COUNTRY TRAINING PROGRAMME

The Japanese Preliminary Survey Team, organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Prof. Seiki KYAN, visited the Republic of Kenya from August 10<sup>th</sup>, 1993 to August 18<sup>th</sup>, 1993 and had a series of discussions with the authorities concerned of the Government of the Republic of Kenya with respect to the framework of a training course in the field of applied electrical and electronic engineering technology under JICA's Third Country Training Programme, and agreed to the desirable measures to be taken by both Governments to ensure the successful implementation of the course. Based on the above discussions, the Resident Representative of JICA Kenya Office and the authorities concerned of the Government of the Republic of Kenya agreed to recommend to their respective Governments the matters referred to in the documents attached hereto.

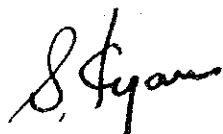
NAIROBI, SEPTEMBER ,1993

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Mr. Toshikazu NAGASHIMA  
Resident Representative  
JICA KENYA Office

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Mr. Benjamin K. KIPKULEI  
Permanent Secretary  
MINISTRY OF EDUCATION  
Government of Kenya



ATTACHED DOCUMENT

The Government of Japan and the Government of the Republic of Kenya will cooperate with each other in organizing a training course in the field of applied electrical and electronic engineering technology (hereinafter referred to as "the Course") under JICA's Third Country Training Programme.

The Government of the Republic of Kenya will conduct the Course with the support of the technical cooperation scheme of the Government of Japan. The Course will be held once a year from the Japanese fiscal year (JFY) 1993 to JFY 1997, subject to annual consultations between both Governments. The Course will be conducted in accordance with the followings;

1. TITLE

The Course will be entitled "Applied Electrical and Electronic Engineering Technology".

2. PURPOSE

The purpose of the Course is to provide the participants from English speaking countries of central, eastern, and southern African countries with an opportunity to improve their knowledge and techniques in the field of applied electrical and electronic engineering technology.

3. OBJECTIVES

At the end of the course, the participants are expected to have;

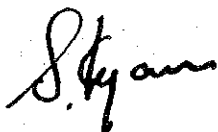
- 3-1 improved techniques and knowledge of electrical and electronic engineering,
- 3-2 refreshed and improved capabilities on design and fabrication of electronic circuits, and
- 3-3 developed appropriate technology in this field suitable for respective local conditions.

4. DURATION

The duration of the Course will be approximately thirty (30) days and the Course for JFY 1993 (hereinafter referred to as "the first Course") will be held from \_\_\_\_\_<sup>th</sup> to \_\_\_\_\_<sup>th</sup>, 1994.

5. CURRICULUM

Tentative curriculum of the first Course is attached as Annex I.



6. INVITED COUNTRIES

The Governments of the following countries will be invited to apply by nominating applicant(s) for the Course: Botswana, Ethiopia, Lesotho, Malawi, Namibia, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.

7. NUMBER OF PARTICIPANTS

The number of participants from the invited countries shall not exceed fifteen (15) in total. [And the number of participants from the Republic of Kenya shall not exceed two (2)].

8. QUALIFICATIONS FOR APPLICANTS

Applicants for the Course are;

- 8-1 to be nominated by their respective Governments in accordance with the procedure stipulated in 10-1 below,
- 8-2 to be presently engaged, or expected to be engaged in the future in electrical and electronic engineering,
- 8-3 to be University graduates or to have a diploma in electrical and/or electronic engineering or in other related fields with at least five years of experience,
- 8-4 to be not more than 40 years of age at the time of application, and
- 8-5 to be in good health, both physically and mentally, in order to complete the Course.

9. FACILITIES AND INSTITUTIONS

The Course will be offered by the Department of Electrical and Electronic Engineering of the Jomo Kenyatta University College of Agriculture and Technology (JKUCAT) in the Republic of Kenya.

10. APPLICATION PROCEDURE

- 10-1 A Government applying for the Course on behalf of its nominee(s) shall forward five (5) copies of the prescribed application form for each nominee to the Government of the Republic of Kenya through diplomatic channels not later than sixty (60) days before the commencement of the Course.
- 10-2 The Government of the Republic of Kenya will inform the applying Governments, through diplomatic channels, whether or not the applicants(s) is/are accepted to the Course not later than thirty (30) days before the commencement of the Course.





11. MEASURES TO BE TAKEN BY THE GOVERNMENT OF JAPAN AND THE GOVERNMENT OF THE REPUBLIC OF KENYA

In organizing and implementing the Course, both Governments will take the following measures in accordance with the relevant laws and regulations in force in each country. The schedule of the first Course implementation is attached as Annex II.

11-1 The Government of the Republic of Kenya

11-1-1 Ministry of Education (hereinafter referred to as "MOE")

- (1) To forward the General Information (G.I.) brochures to the Governments of the invited countries through its diplomatic channels.
- (2) To receive application forms and forward them to JKUCAT.
- (3) To notify the results of the selection of participants to the respective Governments through its diplomatic channels.

11-1-2 JKUCAT

- (1) To formulate the curriculum based on ANNEX I.
- (2) To draft and print the G.I.
- (3) To assign an adequate number of its staff as lecturers/instructors for the Course.
- (4) To provide its training facilities and equipment for the Course.
- (5) To select participants for the Course and notify the JICA Kenya Office (hereinafter referred to as "the JICA Office") and the Ministry of Education of the results.
- (6) To arrange accommodation for participants.
- (7) To arrange international air tickets for participants from the invited countries and to meet and see them off at the airport.
- (8) To arrange domestic study tour(s) as a part of the Course.
- (9) To take budgetary measures to cover the cost of conducting the Course, (such as subsistence, transport costs etc.) excluding the expenses financed by the Government of Japan.
- (10) To issue certificates to the participants who have successfully completed the Course.
- (11) To submit a course report to the JICA Office within thirty (30) days after the completion of the Course.

*S. Iyem*

*Rattilanka*

- (12) To submit a statement of expenditure with the receipts and other documentary evidence necessary to verify the expenditure stated above within thirty (30) days after the completion of the Course.
- (13) To coordinate any matters related to the Course.

#### 11-2 The Government of Japan

- (1) To dispatch Japanese short-term expert(s), in accordance with the normal procedures of its technical cooperation scheme, who will give advice to JKUCAT, and deliver some of the lectures. This, however, is subject to the JICA budget available for this purpose and to the number of suitable expert(s) in Japan. JKUCAT is expected to pre-inform the JICA Office of requests for JICA short-term expert(s) not later than the annual consultation.
- (2) To bear the following expenses through JICA (A tentative estimate of expenses for the first Course is attached as ANNEX III).
  - (a) Expenses relevant to participants from the invited countries such as international economy-class flight fare, accommodation, per-diem and medical insurance premiums.
  - (b) Expenses relevant to teaching aids, expendable supplies, copies, honoraria for external lecturer(s) and opening & closing ceremonies.

#### 12 PROCEDURE FOR REMITTANCE AND EXPENDITURE

Remittance of funds for expenses to be borne by the Government of Japan and the expenditure thereof will be arranged in accordance with the following procedure:

- 12-1 JKUCAT will open a bank account in the Republic of Kenya to receive the funds remitted by JICA, and inform the JICA Office of the name of the bank, the account code number and the name of the account holder.
- 12-2 JKUCAT will submit to the JICA Office a bill of estimate for the expenses to be borne by the Government of Japan not later than sixty (60) days before the commencement of the Course.
- 12-3 JICA will assess the bill of estimate and remit the assessed amount of expenses to the account mentioned in 12-1 above within thirty (30) days after the receipt of the bill of estimate.

*S. Ajan*

*R. W. K. K. K.*

- 12-4 JKUCAT will submit to the JICA Office a statement of expenditure within thirty (30) days after the completion of the Course.
- 12-5 In case there is any unspent amount remitted by JICA, JKUCAT will reimburse the unspent amount to JICA in accordance with the advice given by JICA. The funds allocated for the flight fare, accommodation, per-diem and medical insurance premiums shall not be appropriated for any other purposes.
- 12-6 When requested by JICA, JKUCAT will make available for JICA's reference all the receipts and other documentary evidence necessary to verify the expenditures stated in 12-4 above.

13. OTHERS

This attached document and the following Annexes attached hereto shall be deemed to be part of the Record of Discussions:

- ANNEX I : Tentative curriculum of the Course (for JFY 1993)
- ANNEX II : Schedule of the Course Implementation (for JFY 1993)
- ANNEX III : Tentative Estimate of Expenses to be borne by the Government of Japan (for JFY 1993)

*S. Hyam*

*R. M. Ullrich*

## TENTATIVE CURRICULUM OF THE COURSE

FOR JAPANESE FY 1993

The department proposes that Circuit Design and Printed Circuit Board (PCB) fabrication be the central themes of the training.

## 1. Country Report

- 1-1 Present status of technical programmes related to PCB fabrication;
- 1-2 Current status of technical institutions;
- 1-3 Problems associated with circuit design and PCB fabrication;
- 1-4 Areas of training necessary, and
- 1-5 Identification of constraints and recommendations of strategies for training program.

## 2. Power Circuits

- 2-1 Circuits in the areas of Power Supplies, Inverter/Converter and Uninterruptable Power Supply (UPS);
- 2-2 Lectures and design of these circuits;
- 2-3 Mounting of the circuits on strip boards, and
- 2-4 Testing and adjustments.

## 3. Signal Circuits

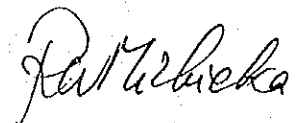
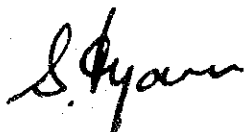
- 3-1 Circuits in the areas of Active Filters, Telecommunications, Instrumentation and control;
- 3-2 Lectures and design of these circuits;
- 3-3 Mounting of the circuits on strip boards, and
- 3-4 Testing and adjustments.

## 4. Manual Fabrication of PCBs

- 4-1 Lectures on manual PCB fabrication, and
- 4-2 Processing of the PCB: etching, drilling, printing labels of components, test points etc.

## 5. Computer Fabrication of PCBs

- 5-1 Lectures on computer fabrication of PCBs, and
- 5-2 Processing of the PCB: etching, drilling, printing labels of components, test points etc.



## SCHEDULE OF COURSE IMPLEMENTATION FOR JAPANESE FY 1993

MONTH	KENYA SIDE	JAPANESE SIDE
September 1993	<ol style="list-style-type: none"> <li>1. Signing of Record of Discussions</li> <li>2. Preparation of G.I.</li> <li>3. Opening of Bank Account</li> <li>4. Submission of Bill of Estimate</li> </ol>	<ol style="list-style-type: none"> <li>1. Signing of Record of Discussions</li> </ol>
October 1993	<ol style="list-style-type: none"> <li>1. Distribution of G.I. and Application Form</li> </ol>	<ol style="list-style-type: none"> <li>1. Remittance of Expenses</li> </ol>
January 1994	<ol style="list-style-type: none"> <li>1. Receipt of Application Form</li> <li>2. Selection &amp; Notification of the Participants</li> </ol>	
February 1994	<ol style="list-style-type: none"> <li>1. Implementation of the Course</li> </ol>	
April 1994	<ol style="list-style-type: none"> <li>1. Submission of Statement of Expenditure</li> <li>2. Submission of Course Report</li> </ol>	

*S. Ryan*

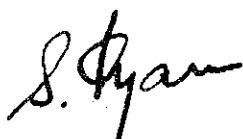
*Rebecca*

## ANNEX III

TENTATIVE ESTIMATE OF EXPENSES TO BE BORNE  
BY THE GOVERNMENT OF JAPAN FOR JAPANESE FY 1993

(US\$)

ITEM OF EXPENSES	BREAKDOWN	AMOUNT
I. INVITATION EXPENSES		
1. Air fares (round trip)	a. Air Fare @ <u>770</u> x <u>15</u> pers. b. Local Airport Tax @ <u>25</u> x <u>15</u> pers.	11,925
2. Per-diem	@ <u>15</u> x <u>35</u> days x <u>15</u> pers.	7,875
3. Accommodation	@ <u>30</u> x <u>34</u> nights x <u>15</u> pers.	15,300
4. Medical insurance	@ <u>100</u> x <u>15</u> pers.	1,500
SUB TOTAL 1		36,600
II. TRAINING EXPENSES		
1. Honoraria for external lecturers	@ <u>100</u> x <u>10</u> days x <u>2</u> pers.	2,000
2. Employment fee for Secretary	@ <u>510</u> x <u>6</u> months x <u>1</u> pers.	3,060
3. Transportation (Bus rental etc. for study tour)		1,230
4. Material procurement	G.I. Printing, Textbook, copy paper, notebook, portfolio etc.	55,000
5. Meeting expenses	Opening ceremony @ <u>25</u> x <u>50</u> pers.	1,250
	Closing ceremony @ <u>25</u> x <u>50</u> pers.	1,250
SUB TOTAL 2		63,790
GRAND TOTAL		100,390




LIST OF PARTICIPANTS

KENYA SIDE

JKUCAT

1. Prof. R.W. Michieka Principal
2. Prof. H.M. Thairu Deputy Principal, Academic Affairs
3. Dr. R.W. Mutua Deputy Principal, Research, Production and Extension
4. Prof. S.M. Maranga Dean, Faculty of Engineering
5. Dr. G.M. Kenji Ag. Dean, Faculty of Agriculture
6. Mr. M.S. Mbogho Chairman, Department of Electrical and Electronic Engineering
7. Dr. S.M. Kangethe Senior Lecturer, Department of Electrical and Electronic Engineering
8. Mr. E.N. Ndungu Lecturer, Department of Electrical and Electronic Engineering
9. Mr. D.B. Konditi Lecturer, Department of Electrical and Electronic Engineering
10. Dr. C. Kiiyukia Lecturer, Department of Food Science & Postharvest Technology
11. Miss C.A. Onyango Lecturer, Department of Food Science & Postharvest Technology
12. Mrs. J.M. Muturia Senior Assistant Registrar, Academic Division

JKUCAT Project

1. Mr. T. Sugiyama Team Leader
2. Prof. J. Iwasa Academic Adviser
3. Mr. K. Oshiyama Project Coordinator
4. Mr. H. Koaze Expert, Department of Food Science & Postharvest Technology
5. Mr. Y. Iwami Expert, Department of Electrical & Electronic Engineering

JAPAN SIDE

JICA Team

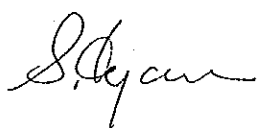
1. Prof. S. Kyan Head of the Japanese Preliminary Survey Team, University of The Ryukyus
2. Ms. N. Hosoi Training Planner, Staff, Third Training Division, Training Affairs Department, JICA

JICA Kenya Office

1. Mr. S. Shibata Assistant Resident Representative
2. Ms. M. Takagi Assistant Resident Representative

Embassy of Japan

1. Mr. K. Sakai First Secretary, Embassy of Japan







PROPOSED MASTER PLAN FOR THIRD COUNTRY TRAINING  
IN  
"APPLIED ELECTRICAL & ELECTRONIC ENGINEERING TECHNOLOGY"  
AT  
JOMO KENYATTA UNIVERSITY COLLEGE OF AGRICULTURE AND TECHNOLOGY

JULY 1993

PREPARED BY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING  
FOR  
THE DISCUSSION WITH THE JICA PRELIMINARY SURVEY TEAM.

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Introduction.

1. Background information on JKUCAT
  - 1.1 JKUCAT
  - 1.2 Department of Electrical and Electronic Engineering
  
2. Proposed Third Country group training program
  - 2.1 Objectives of training
  - 2.2 Participants and requirements
  - 2.3 Achievements expected from the training Programmes
  - 2.4 The Five-year Training Programme
  - 2.5 Assistance from the Governments of Japan and Kenya
  - 2.6 Evaluation and Future Trend

### APPENDICES

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## INTRODUCTION

JKUCAT was initially started as an agricultural middle level college to cater for, agricultural technical extension staff which the country needed urgently. The foundation stone for such a college was formerly laid by His Excellency the second President of Kenya, Hon. Daniel Toroitich arap Moi on 30th July, 1979. The sponsor for this college right from the beginning has been the Government of Japan. The technical agreement ever since has been further strengthened through the Japan International Cooperation Agency (JICA). Through JICA, the Government of Japan was able to provide infrastructure, facilities, equipment and training for both academic and technical staff. It was through such a solid technical assistance that in 1988, H.E. the President of Kenya declared this college a constituent college of Kenyatta University. Hence, in 1989 by a Legal Notice, under Kenyatta University Act (Cap. 210C) the college became Jomo Kenyatta University College of Agriculture and Technology (JKUCAT). In recognition of its initial aim of training manpower in the Agricultural and Engineering fields, JKUCAT embarked on its undergraduate programmes in these same areas.

Right from the inception of the middle level college up to the time the college was upgraded to the status of a University College, the Electrical and Electronic Engineering Department has been in the forefront of producing highly specialised manpower for the National market. In pursuance of its commitment to make the Electrical and Electronic Engineering Department one of the best equipped in this region, JICA has provided modern equipment over the years.

In 1990, the Deputy Principal Academic Affairs asked teaching departments to draft proposals for Third Country Group training. The purpose of such a Group training is to assist in technology development within central, eastern and southern African regions. The Department of Electrical and Electronic Engineering took up the challenge and this year it has come up with such a proposal. Through the technical cooperation and support from JICA, the Department of Electrical and Electronic Engineering has benefitted in training of academic staff, provision of modern equipment and hence mounting such a Group Training will be its contribution to the well being of the citizens of this part of Africa.

## 1. BACKGROUND INFORMATION ON JKUCAT

### 1-1 JKUCAT

#### 1-1-1 A brief History of JKUCAT

Jomo Kenyatta University College of Agriculture and Technology is situated to the North-East of Nairobi, 35 kilometers away from the City Centre, on Nairobi-Thika Road between Thika and Ruiru town.

The College which was started as Jomo Kenyatta College of Agriculture and Technology was established by the Government of Kenya as an institution of Higher Learning with the generous assistance from the Government of Japan. Plans for the establishment of the College started in 1977. In early 1978, the Founding Father of the Nation, the late Mzee Jomo Kenyatta donated two hundred (200) hectares of his farm for the establishment of the College.

The foundation stone for the College was laid by His Excellency the President of the Republic of Kenya, Hon. Daniel Toroitich arap Moi on 30th July, 1979. The College facilities were officially handed over to the then Ministry of Higher Education on 30th April, 1981.

The first group of students was admitted on 4th May, 1981. The College was formally opened on 17th March, 1982 by H.E. the President, Hon. Daniel T. arap Moi. The first graduation ceremony was held in April 1984. During the ceremony, Diploma Certificates were presented to graduates in Agricultural Engineering, Food Technology and Horticulture. In November, 1985 the full cycle of the College's training was completed when the first Engineering Technician graduands joined the second group of Agriculture graduands to receive their certificates at a colorful second graduation ceremony presided over by H.E. the President.

On 1st September, 1988, H.E. the President declared JKUCAT a constituent College of Kenyatta University through a Legal Notice, under Kenyatta University Act (Cap.210C). The Legal Notice appeared in the Kenya Gazette supplement of 28th July, 1989. The name of the College officially changed to Jomo Kenyatta University College of Agriculture and Technology (JKUCAT).

JKUCAT has three Faculties; Faculty of Agriculture, Faculty of Engineering and Faculty of Science. The Faculty of Engineering has four departments; Architecture, Civil Engineering, Electrical and Electronic Engineering, and Mechanical Engineering.

Under the Faculty of Agriculture, there are three departments, namely; Agricultural Engineering, Horticulture and, Food Science and Postharvest Technology. Faculty of Science has three departments, namely; Biological Sciences, Physical Sciences and, Mathematics and Computer Science. The first group of degree students were admitted to the Faculties of Agriculture and Science in 1989. The Faculty of Engineering admitted degree students in 1990.

In addition to the Faculties, the College also has several Institutes, Centres and Production Units which work in collaboration with the Faculties in Academic and Research programmes. The Institute for Human Resources Development offers service courses to students in all Faculties. In 1990, the College established a Board of Post-graduate Studies to work on the modalities of the College offering post-graduate programmes. The programmes are now being developed for implementation.

#### 1-1-2 JICA's Role in the Development of JKUCAT

The Government of Japan, through Japan International Cooperation Agency (JICA), has played and continues to play an important role in the development of JKUCAT. The establishment of a newly organised college of agriculture and technology was planned by 1977. In response to the request of the Government of Kenya, JICA provided the necessary buildings, facilities and teaching equipment through a grant aid programme in the first phase (1978-1981) amounting to Kshs. 192 million. In 1980 JICA started project-type technical co-operation as the Project of Jomo Kenyatta College of Agriculture and Technology for a five year term which involved sending of Japanese experts to JKUCAT, acceptance of Kenyan trainees in Japan and grant of equipment. During this period, the Pilot Farm with a water reservoir was constructed by further Japanese grant aid programme amounting to Kshs. 65 million.

After evaluating the progress of the Project and the development of the College, the co-operation period was extended up to April 1988 based on the agreement by both governments. After the completion of the extension period, the co-operation period was extended again for another two years in order to ensure successful consolidation of the Project. The Diploma Project was terminated in April, 1990. During the ten year technical co-operation period JICA sent 115 Japanese experts and 53 Japanese volunteers with technical equipment worth 700 million yen to Kenya and received 109 Kenyan counterparts for technical training and observation tours.

In April 1990, an agreement for the undergraduate project was signed between the two governments. Through the grant aid programme JICA was to put up additional infrastructure to enable JKUCAT cope with undergraduate programmes. Through the Technical co-operation project JICA would continue sending experts to JKUCAT and members of the JKUCAT staff to Japan for training. Since then the infrastructure including a new Library, new Lecture Halls, Laboratories, Workshop and a new Administration building have been completed. Several members of JKUCAT staff have been sent to Japan for training while others have been sent to third countries with JICA funding.

### 1-1-3 Objectives and Functions of JKUCAT

As spelled out in the JKUCAT Order of July 1989, the objectives and functions of the University College are:

- 1-1-3-1 To provide directly, or in collaboration with other institutions of higher learning facilities for University education (including agricultural, technological, scientific and professional education), the integration of teaching, research and effective application of knowledge and skills to the life, work and welfare of the citizens of Kenya;
- 1-1-3-2 To participate in the discovery, transmission and preservation of knowledge and to stimulate the intellectual life, economic, agricultural and cultural development of Kenya;
- 1-1-3-3 To conduct examinations for such awards as may be provided in the statutes pertaining to the University College, and
- 1-1-3-4 To examine and make proposals for the establishment of new departments, resource and research centres, new degree courses, or new subjects of study.

### 1-1-4 Organization of The University College

#### 1-1-4-1 The Principal

The University college's Chief Executive Officer is the Principal. He has overall responsibility for directing, organizing and administering the College and its programmes. He is the Chairman of the Academic Board and is responsible to the University College Council for the general conduct and discipline of the students. The Principal is assisted by three Deputy Principals for Administration, Academic Affairs and, Research, Production and Extension, respectively.

#### 1-1-4-2 University College Council

The University College Council is the supreme body of the University College with responsibility for:

- (1) The administration of the property and funds for the College;
- (2) Receipt and disbursement of donations, gifts and grants;
- (3) Entering into appropriate association with other institutions of learning;
- (4) Providing for staff welfare, and
- (5) Making regulations governing the conduct of students in consultation with the Academic Board.

#### 1-1-4-3 Academic Board

The University College Academic Board is the supreme body of the College. The duties and powers of the Academic Board are:

- (1) To satisfy itself regarding the content and academic standard of any course of study in respect of any degree, diploma certificate or other award of the University College and to report its findings thereon to the Senate of the Kenyatta University;
- (2) To propose regulations for consideration by the Senate of the Kenyatta University regarding the eligibility of persons for admission to a course of study;
- (3) To propose regulation for consideration by the Senate of Kenyatta University regarding the standard of proficiency to be gained in each examination for a degree, diploma, certificate or other award of the University College;
- (4) To decide which persons have attained the prescribed standard of proficiency and are fit to be granted a degree, diploma certificate or other award of the University College, and
- (5) To make regulations governing such other matters as are within its powers in accordance with the Order or the Statutes.

Neither the Senate of Kenyatta University, nor the Council of JKUCAT may reject, amend, revoke or change any matters without referring to the Academic Board.

#### 1-1-4-4 Budget

Year	Total Recurrent Budget (K£)
1989/90	5,075,628
1990/91	4,945,350
1991/92	5,473,136
1992/93	4,431,980
1993/94	5,559,984

The apparent decline in the budget for the current financial year is as a result of the structural adjustments which has affected the National Universities in the country.

#### 1-2 DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

##### 1-2-1 Introduction

The electrical and electronic engineering department, like the University College, opened its doors to the first batch of students in 1981. The aims of the department are as follows:

- 1-2-1-1 To instill into students the culture of the pride of working with their own hands;
- 1-2-1-2 To impart basic scientific knowledge underlying the beauty of the state of art in electrical and electronics engineering;
- 1-2-1-3 To instill into students a systematic and analytic diagnostic attitude towards trouble shooting;
- 1-2-1-4 To help students develop the right attitude towards the need of society and their aspiration as well as sense of responsibility;
- 1-2-1-5 To impart basic knowledge to the students on entrepreneurship so as to enable them to be self employed, and
- 1-2-1-6 To cultivate in the students an appreciation of the necessity and desire to continue learning both formally and informally.

##### 1-2-2 Students Enrolment

The students enrolment from 1981 to 1993 is as shown in Table 1.2.1.



Table 1.2.1 Student Enrolment 1981 to 1993

YEAR	THREE YEAR DIPLOMA	FIVE YEAR DEGREE
	NUMBER ADMITTED	NUMBER ADMITTED
1981	25	none
1982	26	"
1983	27	"
1984	29	"
1985	28	"
1986	29	"
1987	30	"
1988	30	"
1989	31	"
1990	34	31
1991	31	30
1992		
1993	33	25

#### 1-2-3 Three Year Diploma Programme

This is a three year course offered in the Department of Electrical and Electronic Engineering. It is intended to develop adequately educated and trained technical manpower for absorption into industry. The students pursuing the course are expected to acquire adequate theoretical and practical skills. Practical attachment in industry is an important part of the course. The first year students undertake an internal practical attachment in the department for a period of 8 weeks. During the second year, the students go out for a period of 8 weeks in industry.

#### 1-2-4 Five Year Degree Programme

This is a five year undergraduate programme designed to train engineers who can work independently. Great emphasis is placed on fundamentals and students are encouraged to carry out investigative research. During the 4th and 5th years, students specialise either in Heavy or Light current options. A practical attachment in the industry for a period of 8 weeks is done at the end of the 2nd semester of the 2nd, 3rd and 4th years.

#### 1-2-5 Laboratories/Workshops

The department has modern, well equipped laboratories and workshops to cater for both academic training and research activities. These facilities are:

- (1) Electrical Machines Laboratory.
- (2) High voltage and power system laboratory.
- (3) Communication laboratory.
- (4) Control and measurements laboratory.
- (5) Electronics laboratory.
- (6) Illumination laboratory.
- (7) Basic Electrical laboratory.
- (8) Installation workshop.

#### 1-2-6 Research/Seminars

The department encourages both staff and students to do research. Currently the department's research activities are in the following areas:

- (1) Development of appropriate technology;
- (2) Energy management and saving, and environmental protection;
- (3) Development of computer aided educational software;
- (4) Study of semiconductor contacts, and
- (5) Analogue Filters.

Every year, since 4th August, 1991, the department holds a seminar in collaboration with the Tottori University (Japan) to disseminate knowledge of research findings in the field of Electrical and Electronic Engineering.

#### 1-2-7 Academic Staff

The composition of staff is as follows:-

M.S. Mbogho	Chairman/Senior Lecturer M.Sc.
D.K. Murage	Senior Lecturer Ph.D
S.M. Kangethe	Senior Lecturer Ph.D
Y. Iwami	Japanese Expert M.Sc.

P.K. Hinga	Lecturer M.Sc.
S.L. Ogaba	Lecturer M.Sc.
V.M. Dharmardhikary	Lecturer M.Sc.
L.M. Ngoo	Lecturer (on study leave in Canada) M.Sc.
F.G. Nalwa	Lecturer B.Sc.
P.M. Anangi	Lecturer M.Sc.
Mrs. V. Magoha	Lecturer M.Sc.
E.N. Ndungu	Lecturer M.Sc.
D.O. Konditi	Lecturer M.Sc.
H.O. Absaloms	Assistant Lecturer M.Sc.
P.K. Kihato	Assistant Lecturer M.Sc.
F.N. Mumba	Teaching Assistant(on study leave in Japan), B. Tech.
C. Wekesa	Teaching Assistant(on study leave, Nairobi) B.Sc.
E.M. Weke	Teaching Assistant(on study leave in Japan) B.Tech.
J. Okello	Teaching Assistant. B. Tech.
G. Okello	Teaching Assistant. B. Tech.
K.K. Gitundu(Mrs)	Teaching Assistant. B.Sc.
E.W. Mwangi	Chief Technician Higher National Diploma (HND).

In addition to the academic staff, there is a Technician in charge of each laboratory and workshop.

## 2. PROPOSED THIRD COUNTRY GROUP TRAINING

### 2-1 OBJECTIVES OF THE TRAINING

The general and specific objectives of the proposed training programme are as follows:

#### 2-1-1 General Objectives

2-1-1-1 To enhance the application of electrical and electronic engineering technology in improving the social economic status of the people of central, eastern and southern African regions, and

2-1-1-2 To provide a forum for imparting and exchanging new developments and innovations in electrical and electronic engineering technology.

#### 2-1-2 Specific Objectives

At the end of the course, the participants are expected to have:

2-1-2-1 Improved their techniques and knowledge in circuit designs;

2-1-2-2 Acquired better skills in designing Printed Circuit Boards using manual and computer aided techniques, and

2-1-2-3 Developed suitable technology in this field appropriate for their respective local conditions.

### 2-2 PARTICIPANTS AND REQUIREMENTS

The participants will be drawn from English-speaking countries in the central, eastern and southern African regions and they must be not more than 40 years of age. They must also meet the following requirements:

2-2-1 Have a good command of spoken and written English, and

2-2-2 Be holders of BSc or its equivalent in related areas, or

2-2-3 Be holders of Diploma or its equivalent and must have at least five years industrial experience in related areas.

2-2-4 Be in good health, both physically and mentally, in order to complete the course.

### 2-3 EXPECTED OUTCOME FROM THE TRAINING PROGRAMME

The proposed training programme will provide the participants with an opportunity to understand circuit design and the technology of Printed Circuit Board (PCB) fabrication and accelerate future intellectual exchange between JKUCAT and external institutes within the region. By the end of the five-year period the department expects to have trained participants from the region on circuit design and PCB fabrication who will in turn apply this technology in their respective countries.

### 2-4 THE FIVE YEAR TRAINING PROGRAMME

The first training session is proposed to start in 1993/94 Japanese fiscal year. Thereafter, successive training programmes will be carried out every year up to 1997/98. The general outline of the five year training programme, proposed by the Department of Electrical and Electronic engineering is as shown in Table 2.4.1.

Table 2.4.1. The Training Programme from 1993/94 to 1997/98.

1	YEARS	1993/94	1994/95	1995/96	1996/97	1997/98
2	Duration (days)	30	30	30	30	30
3	Participants (number)	13-15	13-15	13-15	13-15	13-15
4	Participating Countries* (number)	7-10	7-10	7-10	7-10	7-10
5	Title or Type of training Programme	Circuit Design and PCB Fabrication				
6	Qualification of participants **	BSc or Diploma with five years experience				
7	Resource persons (number)	JKUCAT-7		Other-2		
8	Course content ***	1. Design of signal & power circuits and testing. 2. Manual and Computer aided fabrication of PCBs 3. Processing of PCBs.				

PCB - Printed Circuit Boards.

- \* See Appendix I
- \*\* See Section 2.2
- \*\*\* See Appendix III

2-5 THE DEVELOPMENT OF PROGRAMME OBJECTIVES DURING THE FIVE YEAR PERIOD

This will be as shown below.

Year	General Objectives	Specific Objectives
1993 to 1998	1. Discussion on Situation of Respective Countries 2. Technical training	1. Country reports 2. Design of power and signal circuits 3. Manual and Computer aided design of PCBs 4. Fabrication and processing of PCBs.

2-6 MEASURES TO BE TAKEN BY THE GOVERNMENT OF JAPAN AND THE GOVERNMENT OF THE REPUBLIC OF KENYA

In organizing and implementing the Course, both Governments will take the following measures in accordance with the relevant laws and regulations in force in each country. The schedule of the first Course implementation is attached as Annex II.

2-6-1 The Government of the Republic of Kenya

2-6-1-1 Ministry of Education (hereinafter referred to as "MOE")

- (1) To forward the General Information (G.I.) brochures to the Governments of the invited countries through its diplomatic channels.
- (2) To receive application forms and forward them to JKUCAT.
- (3) To notify the results of the selection of participants to the respective Governments through its diplomatic channels.

2-6-1-2 JKUCAT

- (1) To formulate the curriculum based on Appendix III.
- (2) To draft and print the G.I.
- (3) To assign an adequate number of its staff as lecturers/instructors for the Course.
- (4) To provide its training facilities and equipment for the Course.
- (5) To select participants for the Course and notify the JICA Kenya Office (hereinafter referred to as "the JICA Office") and the Ministry of Education of the results.
- (6) To arrange accommodation for participants.
- (7) To arrange international air tickets for participants from the invited countries and to meet and see them off at the airport.
- (8) To arrange domestic study tour(s) as a part of the Course.
- (9) To take budgetary measures to cover the cost of conducting the Course, (such as subsistence, transport costs etc.) excluding the expenses financed by the Government of Japan.
- (10) To issue certificates to the participants who have successfully completed the Course.
- (11) To submit a course report to the JICA Office within thirty (30) days after the completion of the Course.
- (12) To submit a statement of expenditure with the receipts and other documentary evidence necessary

to verify the expenditure stated above within thirty (30) days after the completion of the Course.

(13) To coordinate any matters related to the Course.

## 2-6-2 The Government of Japan

2-6-2-1 To dispatch Japanese short-term expert(s), in accordance with the normal procedures of its technical cooperation scheme, who will give advice to JKUCAT, and deliver some of the lectures. This, however, is subject to the JICA budget available for this purpose and to the number of suitable expert(s) in Japan. JKUCAT is expected to pre-inform the JICA Office of requests for JICA short-term expert(s) not later than the annual consultation.

2-6-2-2 To bear the following expenses through JICA (A tentative estimate of expenses for the first Course is attached as Appendix IV).

(a) Expenses relevant to participants from the invited countries such as international economy-class flight fare, accommodation, per-diem and medical insurance premiums.

(b) Expenses relevant to teaching aids, expendable supplies, copies, honoraria for external lecturer(s) and opening & closing ceremonies.

## 2-7 PROCEDURE FOR REMITTANCE AND EXPENDITURE

Remittance of funds for expenses to be borne by the Government of Japan and the expenditure thereof will be arranged in accordance with the following procedure:

2-7-1 JKUCAT will open a bank account in the Republic of Kenya to receive the funds remitted by JICA, and inform the JICA Office of the name of the bank, the account code number and the name of the account holder.

2-7-2 JKUCAT will submit to the JICA Office a bill of estimate for the expenses to be borne by the Government of Japan not later than sixty (60) days before the commencement of the Course.

2-7-3 JICA will assess the bill of estimate and remit the assessed amount of expenses to the account mentioned in 2-7-1 above within thirty (30) days after the receipt of the bill of estimate.

2-7-4 JKUCAT will submit to the JICA Office a statement of expenditure within thirty (30) days after the completion of the Course.

2-7-5 In case there is any unspent amount remitted by JICA, JKUCAT will reimburse the unspent amount to JICA in accordance with the advice given by JICA. The funds allocated for the flight fare, accommodation, per-diem and medical insurance premiums



shall not be appropriated for any other purposes.  
2-7-6 When requested by JICA, JKUCAT will make available for JICA's reference all the receipts and other documentary evidence necessary to verify the expenditures stated in 2-7-4 above.

## 2-8 EVALUATION

Both the Governments of Japan and Kenya will evaluate the programme regularly and suggest any necessary changes in both the contents and implementation. To facilitate this, the department will prepare, for perusal, the following:

- (a) Training manuals;
- (b) Details of the Training Programmes, and
- (c) Annual reports.

## 2.9 FUTURE DEVELOPMENT

On successful completion of the first five years of the programme, the department may propose the following for consideration:

- (1) A further five year programme;
- (2) Expansion of the programme in terms of the number of countries and participants;
- (3) Broadening the training to cover a wider range of topics, and
- (4) Raising the level of training.

**APPENDIX I**

**Questionnaire**

JOMO KENYATTA UNIVERSITY COLLEGE OF AGRICULTURE AND TECHNOLOGY  
ELECTRICAL & ELECTRONIC ENGINEERING DEPARTMENT

QUESTIONNAIRE ON THE PROPOSED THIRD COUNTRY GROUP TRAINING  
PROGRAMME TO BE SPONSORED BY JICA

NAME OF RESPONDENT -----  
DESIGNATION -----  
NAME OF INSTITUTION -----  
ADDRESS -----  
-----  
-----  
TELEPHONE NUMBER -----  
TELEX ----- FAX -----

1. What type is your Institution/Organization?  
Private company  
University  
Parastatal  
Government department  
Research Institute  
Others  
(Specify)-----

2. What activities is your Institution/Organization engaged in?  
Research  
Education/Training  
Design & Fabrication  
Production  
Others  
(Specify)-----

3. Does your Institution/Organization specialise in any of the following areas related to Electrical Engineering?

(a) Design and fabrication of electronic circuits.

YES  
NO

(b) Design and fabrication of simple electrical education kits.

YES  
NO

(c) Management of National energy resources of your country.

YES  
NO

(d) Development of appropriate technology applicable to local conditions in your country.

YES  
NO

(e) Assessment of the implications of high technology in the performance of the national economy of your country.

YES  
NO

4. Give the number of staff in your Institution/  
Organization who participate in the specialised areas as  
outlined in (3) above:

(i) B.Sc. holders and above -----

(ii) Diploma holders -----

(iii) Others (Specify) -----

5. Provide details of the number of staff and their qualifications  
in your Institution/Organization who are specialised in the  
following areas:

(i) Power Systems -----  
( e. g, 2B.Sc., 3M.Sc;..)

(ii) Energy Studies -----

(iii) Instrumentation -----

(iv) Control Engineering -----

(v) High Voltage Eng. -----

(vi) Electrical Circuits -----

(vii) Communication Eng. -----

(viii) Electrical Machines -----

- (ix) Electronics -----
- (x) Microprocessors/  
Computers -----
- (xi) Others (Specify) -----

6. Do you think your Institution/Organization and staff would benefit from the proposed training?

YES  
NO

If YES, how many members of staff-----

7. Are there other areas you would like to be included or omitted from the attached proposed course outline?

YES  
NO

If YES, give details -----

-----  
-----

8. Do you think the duration of the course is adequate?

YES  
NO

If NO, give your suggestion(s).

-----  
-----  
-----

9. Give your personal views regarding the proposed group training.

-----  
-----  
-----

NOTE: If the space provided is not sufficient, please write on a separate sheet of paper and attach.

**APPENDIX II**  
**Analysis of the Responses to the Questionnaires**

JOMO KENYATTA UNIVERSITY COLLEGE OF AGRICULTURE AND TECHNOLOGY

ELECTRICAL & ELECTRONIC ENGINEERING DEPARTMENT

ANALYSIS OF THE RESPONSES TO THE QUESTIONNAIRE AS OF 11/06/93

1. Types of Institution/Organization                      Number of respondents

Private company	.....	2
University	.....	6
Parastatal	.....	4
Government department	.....	2
Research Institute	.....	4
Others	.....	5
Total	.....	<u>23</u>

2. Activities Institution/Organization engaged in                      Number

Research	.....	15
Education/Training	.....	13
Design & Fabrication	.....	12
Production	.....	6
Others	.....	3
Total	.....	<u>49</u>

3. Institution/Organization specialisation in areas related to Electrical Engineering (Total = 16)

<u>Area</u>	<u>Number</u>
(a) Design and fabrication of electronic circuits.....	15
(b) Design and fabrication of simple electrical education kits. ....	14
(c) Management of National energy resources .....	7
(d) Development of appropriate technology applicable to local conditions. ....	17
(e) Assessment of the implications of high technology in the performance of the national economy .....	10

4. Number of staff in Institution/Organization who participate in the specialised areas as outlined in (3) above:

<u>Qualification</u>	<u>Number</u>
(i) B.Sc. holders and above (Ph.D, MSc, BSc, HDip) . . . . .	366
(ii) Diploma holders . . . . .	273
(iii) Others (Specify) . . . . .	97
<hr/>	
Total . . . . .	736

5. Details of the number of staff and their qualifications in Institution/Organization who are specialised in the following areas: (P=PhD, M=MSc, B=BSc, H=HDip, D=Dip, T=Technician)

<u>Area</u>	<u>Staff &amp; Qualifications</u>	<u>Total</u>
(i) Power Systems	3-P, 8-M, 12-B, 19-H, 5-D	.... 47
(ii) Energy Studies	7-P, 8-M, 0-B, 0-H, 3-D, 3-T	... 21
(iii) Instrumentation	4-P, 15-M, 6-B, 2-H, 6-D, 1-T	... 34
(iv) Control Engineering	2-P, 8-M, 6-B, 3-H, 0-D, 1-T	... 20
(v) High Voltage Eng.	1-P, 1-M, 6-B, 2-H, 1-D, 0-T	... 11
(vi) Electrical Circuits	1-P, 18-M, 13-B, 0-H, 20-D, 14-T	..66
(vii) Communication Eng.	3-P, 19-M, 91-B, 69-H, 10-D, 151-H	..343
(viii) Electrical Machines	3-P, 6-M, 11-B, 8-H, 16-D, 10-T	.. 54
(ix) Electronics	1-P, 12-M, 10-B, 10-H, 8-D, 6-T	... 47
(x) Microprocessors/ Computers	0-P, 14-M, 1-B, 4-H, 6-D, 8-T	... 33
(xi) Others (Specify)	0-P, 1-M, 2-B, 1-H, 0-D, 2-T	... 06
<hr/>		
Total . . . . .	.....	693

6. Institution/Organization and Staff that believe they would benefit from the proposed training . . . . . 23  
 Members of staff from (6) above . . . . . 405



7. Other areas suggested for inclusion or omission from the proposed course outline attached

Number of Institutions/Organisations suggesting changes ... 07

Suggested changes

- (i) Maintenance and Servicing
- (ii) Entrepreneur training
- (iii) Biomedical Engineering
- (iv) Design of control circuits for electrical machines  
e.g. PLCs, Process Control

8. Number who think the course duration course is inadequate . 9

Suggested duration(s).

- (i) 6 - 8 weeks

9. Personal views regarding the proposed group training :

- (i) Positive ..... 18
- (ii) Negative ..... 02
- (iii) None committal .....03

**APPENDIX III**

**Tentative Curriculum of the Course**

**TENTATIVE CURRICULUM OF THE COURSE**

The department proposes that Circuit Design and Printed Circuit Board (PCB) fabrication be the central themes of the training.

**1. Country Report**

- 1-1 Present status of technical programmes related to PCB fabrication;
- 1-2 Current status of technical institutions;
- 1-3 Problems associated with circuit design and PCB fabrication;
- 1-4 Areas of training necessary, and
- 1-5 Identification of constraints and recommendations of strategies for training program.

**2. Power Circuits**

- 2-1 Circuits in the areas of Power Supplies, Inverter/Converter and Uninterruptable Power Supply (UPS);
- 2-2 Lectures and design of these circuits;
- 2-3 Mounting of the circuits on strip boards, and
- 2-4 Testing and adjustments.

**3. Signal Circuits**

- 3-1 Circuits in the areas of Active Filters, Telecommunications, Instrumentation and control;
- 3-2 Lectures and design of these circuits;
- 3-3 Mounting of the circuits on strip boards, and
- 3-4 Testing and adjustments.

**4. Manual Fabrication of PCBs**

- 4-1 Lectures on manual PCB fabrication, and
- 4-2 Processing of the PCB: etching, drilling, printing labels of components, test points etc.

**5. Computer Fabrication of PCBs**

- 5-1 Lectures on computer fabrication of PCBs, and
- 5-2 Processing of the PCB: etching, drilling, printing labels of components, test points etc.

**APPENDIX IV**  
**Tentative Estimate of Expenses**

APPENDIX IV

**TENTATIVE ESTIMATE OF THE EXPENSES**

The following tentative budget has been prepared for the first year (1993/94) of the programme. The number of participants is designed to be 15 and the duration of the training to be 30 days.

BUDGET ESTIMATES.

(US\$)

ITEM OF EXPENSES	BREAKDOWN	AMOUNT
<b>I. INVITATION EXPENSES</b>		
1. Air fares (round trip)	a. Air Fare @ <u>770</u> x <u>15</u> pers. b. Local Airport Tax @ <u>25</u> x <u>15</u> pers.	11,925
2. Per-diem	@ <u>15</u> x <u>35</u> days x <u>15</u> pers.	7,875
3. Accommodation	@ <u>30</u> x <u>34</u> nights x <u>15</u> pers.	15,300
4. Medical insurance	@ <u>100</u> x <u>15</u> pers.	1,500
SUB TOTAL 1		36,600
<b>II. TRAINING EXPENSES</b>		
1. Honoraria for external lecturers	@ <u>100</u> x <u>10</u> days x <u>2</u> pers.	2,000
2. Employment fee for Secretary	@ <u>510</u> x <u>6</u> months x <u>1</u> pers.	3,060
3. Transportation (Bus rental etc. for study tour)		1,230
4. Material procurement	G.I. Printing, Textbook, copy paper, notebook, portfolio etc.	55,000
5. Meeting expenses	Opening ceremony @ <u>25</u> x <u>50</u> pers.	1,250
	Closing ceremony @ <u>25</u> x <u>50</u> pers.	1,250
SUB TOTAL 2		63,790
<b>GRAND TOTAL</b>		<b>100,390</b>

APPENDIX V

Tentative Programme of the First Course

APPENDIX V

SCHEDULE FOR COURSE IMPLEMENTATION

(FOR JAPANESE FY 1993)

<b>MONTH</b>	<b>KENYA SIDE</b>	<b>JAPANESE SIDE</b>
September 1993	<ol style="list-style-type: none"><li>1. Signing of Record of Discussions</li><li>2. Preparation of G.I.</li><li>3. Opening of Bank Account</li><li>4. Submission of Bill of Estimate</li></ol>	<ol style="list-style-type: none"><li>1. Signing of Record of Discussions</li></ol>
October 1993	<ol style="list-style-type: none"><li>1. Distribution of G.I. and Application Form.</li></ol>	<ol style="list-style-type: none"><li>1. Remittance of Expenses</li></ol>
November 1993	<ol style="list-style-type: none"><li>1. Opening of Bank Account</li><li>2. Submission of Bill of Estimate</li></ol>	
January 1994	<ol style="list-style-type: none"><li>1. Receipt of Application Form</li><li>2. Selection &amp; Notification of the Participants</li></ol>	
February 1994	<ol style="list-style-type: none"><li>1. Implementation of the Course</li></ol>	
April 1994	<ol style="list-style-type: none"><li>1. Submission of Statement of Expenditure</li><li>2. Submission of Course report</li></ol>	

**APPENDIX VI**

**Tentative Programme of the First Course**



APPENDIX VI

## TENTATIVE PROGRAMME OF THE FIRST COURSE 1993/94

DAY	ACTIVITY
1 (Mon)	Registration, Opening Ceremony, Introduction
2 (Tue)	Country reports
3 (Wed)	Circuit design and Testing
4 (Thur)	Circuit design and Testing
5 (Fri)	Circuit design and Testing
6 (Sat)	OFF
7 (Sun)	OFF
8 (Mon)	Circuit design and Testing
9 (Tue)	Manual PCB Design
10 (Wed)	Manual PCB Design
11 (Thur)	Manual PCB Design
12 (Fri)	Study Tour
13 (Sat)	OFF
14 (Sun)	OFF
15 (Mon)	Manual PCB design
16 (Tue)	Computer Aided PCB Design
17 (Wed)	Computer Aided PCB Design

CONT...	
18 (Thur)	Computer Aided PCB Design
19 (Fri)	Computer Aided PCB Design
20 (Sat)	OFF
21 (Sun)	OFF
22 (Mon)	Processing of the PCB: etching, drilling, mounting of components etc.
23 (Tue)	Processing of the PCB: etching, drilling, mounting of components etc.
24 (Wed)	Processing of the PCB: etching, drilling, mounting of components etc.
25 (Thur)	Discussions on the Training
26 (Fri)	STUDY TOUR
27 (Sat)	OFF
28 (Sun)	OFF
29 (Mon)	Compilation and Submission of Report
30 (Tue)	Closing Ceremony



JICA