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FACULTY OF SCIENCE AND ENGINEERING

**DEPARTMENT OF ELECTRICAL AND COMMUNICATIONS
ENGINEERING**

**BACHELOR OF SCIENCE IN ELECTRICAL AND
COMMUNICATIONS ENGINEERING**

1.0. INTRODUCTION

The department of Electrical and Communication Engineering is one of the department in the Faculty of Engineering. The department offers a Bachelor of Science degree in Electrical and Communication Engineering. The programme prepares graduates for a successful career in such sectors as manufacturing, operations, services and research with emphasis on design and development. This curriculum lays emphasis on basic Sciences and Mathematics in the beginning, followed by technical courses incorporating the main branches of Electronics, Telecommunications, Instrumentation, Control Engineering, Microprocessor Systems and Applications, Electrical Machines and Electrical Power Engineering. The main thrust of the curriculum is the development of practical proficiency with sound theoretical basis. The practical proficiency is achieved through extensive laboratory training, seminars, engineering projects, workshop practice, industrial visits, and industrial attachments.

The use of computers is integrated into the Electrical and Communications engineers' training because it is a vital tool. Courses on Engineering Management and Engineering Entrepreneurship prepare the engineers for management role they will assume in industry.

The prime knowledge is concentrated in the core courses while the remaining courses required are selected from a range of options to suit a student's specific interests and chosen career specialization area. These options address issues likely to be experienced in practice and so familiarize the future graduate with problems that will be faced in industry.

2.0. OBJECTIVES

The objectives of the Programme are:

- a) To train students in generation, transmission and use of electrical power in manufacturing, telecommunication and other sectors of the service industry.
- b) To impart management skills as a basis for entrepreneurial development and employment creation.
- c) To design, construct and maintain electrical and electronic devices that can be interfaced with computer systems.
- d) To foster positive and responsive attitudes to develop innovative thinking.

3.0. ADMISSION REQUIREMENTS

- a). To be eligible for admission into the degree programme, all applicants must satisfy the minimum entrance requirements stipulated in the common university entrance regulations of the **Joint Admissions Board (JAB) of public Universities.**

- b). Applicants with a minimum mean grade of C+ at KCSE and have attained the minimum grades indicated in the following clusters of four subjects are eligible for admission: (i) Maths B-; Physics B-; Chemistry B-; Biology (or Geography or any Group IV) B-(ii) Maths B-; Physical Science B-; Biological Science B-; Geography (or any Group IV) B-
- c). Holders of a diploma of a recognised institution in electrical engineering or related' disciplines are eligible for admission into the programme as follows:
- (i) Higher National Diploma (HND) - 3rd year
 - (ii) Ordinary diploma with at least a credit – 2nd year
- d). Those holding qualifications equivalent to the above from institutions recognized by the University Senate may also be admitted.

4.0. DURATION OF THE PROGRAMME

The duration of the Programme shall be five academic years each divided into two semesters. In addition, there is an 8-week Workshop Practice after the second year of study and two 8-week Industrial Attachments after the third and fourth years of study.

5.0. DESIGN OF THE DEGREE PROGRAMME

The degree programme is designed to offer sound training in the following core areas:-

- Electronics
- Electrical Machines
- Electrical Power
- Control and Instrumentation
- Microprocessor Systems and Applications
- Telecommunications

Engineering mathematics, computer-based analyses, fundamentals of mechanical engineering and other courses are also offered as compulsory supportive courses in the programme. Selected courses from Social Sciences are built into the programme during the first two years of study to enable students develop a broad education outlook in their training.

6.0. CAREER OPPORTUNITIES

With the increasing demand for electrical power and the tremendous growth of the manufacturing, information and telecommunications industries there are many challenging and exciting jobs awaiting each graduating computer, electrical or electronic engineer.

7.0. EXAMINATION REGULATIONS

(a) The University common semester examination regulations and specific faculty regulations will apply subject to the exceptions given in c(ii) below.

(b) All final written examinations will be of three hour duration.

(c) (i) Continuous assessment and the final examinations will unless otherwise specified, account as follows:

Continuous assessment	30%
Final examination	70%

Continuous assessment shall consist of written tests, assignments and laboratory practicals.

(ii) Exceptions to regulation (a) are:

ECE 200: WORKSHOP PRACTICE

Practicals	70%
Written Report	30%

ECE 300: INDUSTRIAL ATTACHMENT I

Technical Report	70%
Continuous Assessment	30%

ECE 400: INDUSTRIAL ATTACHMENT II

Technical Report	70%
Continuous Assessment	30%

ECE 452: ENGINEERING PROJECT I

Technical Report	40 %
Continuous Assessment	30%
Oral Examination	10%
Construction & Demonstration	20%

ECE 590: ENGINEERING PROJECT II

Continuous Assessment	15%
Technical Report	45%
Oral Defence	10%
Construction & Practical Demonstration	30%

All 'CSC' - coded courses

Continuous Assessment	60%
Written Final Examination	40%

All courses not coded with "ECE" are taught by other departments and will therefore be examined according to the regulations of the teaching Department.

8.0. COURSE CODING

ECE is an abbreviation of Electrical and Communications Engineering. The first digit represents the year of study, second digit represents the serial number of the course in that semester and the third represents the semester.

9.0. UNITS

The Engineering courses are taught in units. A unit is an equivalent of one lecture hour per week spread over one semester. It is also an equivalent of a three hour practicals per week spread over one semester, and also a two hour tutorial per week spread over one semester.

10.0. COURSE CODE AND TITLE**YEAR I****SEMESTER I**

		Units
ECE 101	Introduction to Electrical Engineering	2
ECC 101	Scientific and Technical Communication Skills	3
CDM 100	HIV and AIDS Prevention and Management	3
CSC 110	Fundamentals of Computing	3
ECC 102	State, Society and Development	3
MAT 101	Pure Mathematics I	3
MIE 161	Engineering Drawing I	3
SCH 100	Fundamentals of Chemistry I	4
SPH 110	Fundamentals of Physics I	4
	Total	<u>28</u>

YEAR I**SEMESTER II**

		Units
ECE 102	Circuit Theory I	3
ECE 112	Analogue Electronics I	3
ECE 122	Workshop Technology	3
CSC 109	Computer Applications	3
MAT 103	Pure Mathematics II	3
MIE 164	Engineering Drawing II	3
SCH 101	Fundamentals of Chemistry II	4
STA 104	Basic Statistics I	3
	Total	<u>25</u>

YEAR II**SEMESTER I**

		Units
ECE 201	Analogue Electronics II	3
ECE 211	Circuit Theory II	3
ECE 221	Electrical Measurements	3
ECE 231	Electrical Machines I	3
CSC 201	Computer Programming I	3
MAT 201	Engineering Mathematics I	3
MIE 221	Solid Mechanics I	3
MIE 231	Fluid Mechanics	3
STA 205	Basic Statistics II	3
	Total	<u>27</u>

YEAR II**SEMESTER II**

		Units
ECE 202	Electrical Machines II	3
ECE 212	Computer Operating Systems	3
ECE 222	Power Systems I	3
ECE 232	Analogue Electronics III	3
ECE 242	Digital Electronics I	3
MAT 202	Engineering Mathematics II	3
MIE 213	Materials Science	3
MIE 274	Thermodynamics I	3

Total 24

ECE 290 Workshop Practice (8 weeks) 3

YEAR III**SEMESTER I**

		Units
ECE 301	Signals	3
ECE 311	Electromagnetics I	3
ECE 321	Electrical Machines III	3
ECE 331	Digital Electronics II	3
ECE 341	Power Systems II	3
CSC 312	Software Engineering	3
MAT 301	Engineering Mathematics III	3
MIE 301	Manufacturing Processes	3

Total 24

YEAR III**SEMESTER II**

		Units
ECE 302	Computer programming for Engineers	3
ECE 312	Control Systems I	3
ECE 322	Network Analysis and Synthesis	3
ECE 332	Transmission Lines	3
ECE 342	Communication Systems I	3
ECE 352	Electromagnetics II	3
IRD 301	Economics for Engineers	3
MAT 306	Engineering Mathematics IV	3

Total 24

ECE 390 Industrial Attachment I (8 Weeks)

YEAR IV**SEMESTER I**

	Units
ECE 401 Control Systems II	3
ECE 411 Microprocessor Systems I	3
ECE 421 Communication Systems II	3
ECE 431 Analogue Electronics IV	3
ECE 441 Power Electronics I	3
COS 305 Entrepreneurship	2
MAT 401 Engineering Mathematics V	3

OPTIONS**Either heavy current option (H)**

ECE 451 H Power Systems III	3
ECE 461 H Electric Machine Drives and Industrial Applications	3

Or light current option (L)

ECE 451 L Radar Engineering and Facsimile	3
ECE 461 L Television Engineering	3

Total 26

YEAR IV**SEMESTER II**

	Units
ECE 402 Instrumentation	3
ECE 412 Control Systems III	3
ECE 422 Power Electronics II	3
ECE 432 Microprocessor Systems II	3
ECC 402 Research Methods	3
ECE 480 Engineering Project I	3

OPTIONS**Either heavy current option (H)**

ECE 452 H Non-linear and Multivariable control	3
ECE 462 H Power systems IV	3
ECE 472 H Illumination Engineering	3

Or light current option (L)

ECE 452 L Microwave Engineering	3
ECE 462 L Data Communications	3
ECE 472 L Microelectronics and Optoelectronics	3

Total 24

ECE 490 Industrial Attachment II (8 weeks)

YEAR V**SEMESTER I**

		Units
ECE 501	Control systems IV	3
ECE 511	Testing Methods and Reliability	3
ECE 521	Engineering Management	3
ECC 501	Operations Research	3
ECE 580	Engineering Project II	4

OPTIONS**Either heavy current option (H)**

ECE 531 H	Electrical Machines Design	3
ECE 541 H	High Voltage Technology	3
ECE 551 H	Power System Analysis I	3

Or light current option (L)

ECE 531 L	Antenna and Radio Wave Propagation	3
ECE 541 L	Microprocessor Embedded Systems and Design	3
ECE 551 L	Electro-acoustics	3

Total 25

YEAR V**SEMESTER II**

		Units
ECE 502	Accounting, Finance and Marketing	3
ECE 512	Analogue and Digital Filters	3
ECC 502	Law, Ethics and Professional Practice	3
ECE 590	Engineering Project II	4

OPTIONS**Either heavy current option (H)**

ECE 522 H	Power Systems Protection	3
ECE 532 H	Power Systems Analysis II	3
ECE 542 H	Speciality Machines	3
MIE 572	Renewable Energy Resources	3

Or light current option (L)

ECE 522 L	Mobile Radio and Satellite Communication	3
ECE 532 L	Teletraffic Engineering	3
ECE 542 L	Optic Fibre Communications	3
ECE 552 L	Digital Systems Design	3
Total		<u>25</u>