UNIVERSITY OF PORT HARCOURT

DEPARTMENT OF ELECTRICAL/ELECTRONIC ENGINEERING

HANDBOOK

FOR

B. ENG DEGREE PROGRAMME

2016-2018

1. INTRODUCTION

1.1 Brief History of the Program

The University of Port Harcourt was established by the Federal Military Government in 1975 as a University College. Its establishment was the culmination of a long and sustained demand for a university in Port Harcourt prior to and following the report of the Asbhy Commission of 1960 which recommended the establishment of an Institute of Technology. Following the establishment of the University College of Port Harcourt in early 1975, the Federal Military Government announced in September of the same year the appointment of a distinguished Nigerian scholar, Professor Donald E. U. Ekong, as the Institution's first Principal.

The Electrical/Electronic Engineering Programme commenced in 1979. It is a five-year programme leading to a Bachelor's degree (B.Eng) in Electrical/Electronic Engineering. The curriculum was drawn to produce a balanced Electrical/Electronic Engineer because we believe that it is not in the interest of the young Engineer to be introduced to a premature specialization. This philosophy has proved to be right over the years.

The programme has been reviewed thrice since inception and these exercises were occasioned by the NUC accreditation programme in 1991, 1999 and 2010.

In 1987 the Faculty of Engineering introduced the Master of Engineering Management (MEM) programme. This is a two-year programme with a curriculum that reflects a blend of Management

and Advanced Engineering principles. The degree awarded is MEM in any of the five disciplines (Chemical, Civil, Electrical/Electronic, Mechanical and Petroleum) depending on the candidate's background.

In 1996 the department of Electrical/Electronic Engineering started a Master's programme. It is a two-year programme leading to the award of M.Eng in Power and Machines and Electronics/Telecommunications Engineering. In 2014, a Doctorate degree program was approved by Senate.

1.2 Philosophy and Objectives

The philosophy is to produce a well-balanced Electrical/Electronic engineer. The objectives are:

(i) That the product of the programme should be a competent Electrical/Electronic Engineer, but an expert in one of the specializations in the discipline.

(ii) That the product of the programme should be confident enough to establish a small engineering business if ready –made jobs are not available.

(iii) Finally that the product of the programme can pursue a post-graduate programme in one of the areas in Electrical/Electronic Engineering.

1.3 Admission Requirements

Candidates applying to the undergraduate programme in Electrical/Electronic Engineering should have five credit pass in Chemistry, Physics, Mathematics, English language and

Biology(or Agricultural science) at WAEC and/or NECO at not more than two sittings.

Candidates are also expected to have a minimum score of 200 out of 400 in both the UME and post UME before they can be admitted into the department

1.4 Electrical/Electronic Engineering Programme Structure

The programme structure in Electrical/Electronic Engineering requires five academic calendar years (of ten semesters) of which nine of the ten semesters are actually used for formal class room/laboratory studies. One semester (in the fourth year) and the two long vacations (at the end of second and third and year) are used for industrial training. At the fifth year of studies, students are assigned research project topics and design project topics which they are expected to defend at the end of the tenth semester under an external examiner not below the rank of a Professor.

2.0 ACADEMIC AND SENIOR TECHNICAL STAFF

2.1 Past/Present Deans/Provost

S/N	Name	Period	Designation
1.	Engr. Prof. Chi. U. Ikoku	1983-1999	Dean
2	Engr. Prof. Y.O. Beredugo	1999-2000	Acting dean
3	Engr. Prof. Nwaogazie, Ify. L.	2000-2002	Dean
4	Engr. Prof. A.O. Kuye	2002-2004	Dean
5	Engr. Prof. C. Umezuruike	2004-2005	Dean
6	Engr. Dr. A. Dosunmu	2005-2006	Acting dean
7	Engr. Prof. D.P.S Abam	2006-2008	Dean
8	Engr. Prof. D. Appah	2008-2009	Dean
9	Engr. Prof. J.U. Okoli	2009-2011	Dean
10	Engr. Prof. S.U. Ejiezie	2011-2013	Dean
11	Engr. Prof. D. Appah	2013-2015	Provost
12	Engr. Prof. O.M.O. Etebu	2015-Date	Dean

2.2. Past and Present Heads of Departments

S/N	Name	Period	Designation
1	Dr. J.J.Witkowski	1984-1986	Ag. Head
2	Dr. M.S.Briggs	1986-1989	Ag.Head
3	Dr. S.O.Ugwusie	1989-1990	Ag. Head
4	Dr. A.O.Ibe	1990-2003	Ag. Head
5	Dr. R.Uhunmwangho	2003-2004	Coordinator
6	Dr. A.O.Ibe	2004-2006	Ag. Head
7	Dr. J.J.Biebuma	2006-2008	Ag. Head
8	Dr.U.A.Kamalu	2008-2012	Cordinator
9	Prof.S.N.Ndubisi	2012-2013	Head
10	Dr.R.Uhunmwangho	2013-Date	Ag. Head

2.3 Academic Staff

S/N	Name	Qualification	Field of Specialization	Designation
1.	Engr. Prof.A. O. Ibe	B.Eng(UNN), Ph.D(London) DIC,MNSE (03358),R.Eng.(3497), SMIEEE	Power Systems	Professor
2.	Engr. Prof. S. N. Ndubisi	B.Eng, M.Eng, Ph.D, MNSE (05336), R.Eng (7899)	Power Systems	Professor
3.	Engr. Prof. M. Briggs	B.Sc, M.Sc, Ph.D, MNSE (02118), R.Eng (2701)	Control Systems	Professor
4.	Prof. Enoch O. Nwachukwu	B.Sc (Ife), M.Sc (Manchester), Ph.D (Manchester)	Electrical/ Electronics	Professor
5.	Prof. O.E. Abumere	B.Sc, M.Sc, Ph.D	Solid-State Electronics	Professor
6.	Prof. O. P. Otasowie	B.Sc, M.Sc, Ph.D	Electronics/ Communications	Adjunct Professor
7.	Prof. E. N. C. Okafor	B.Sc., M.Eng, Ph.D	Power Systems	Adjunct Professor
8.	Engr. Dr. G. C. Chidolue	B.Eng (ABU), M.Sc. (Manchester), Ph.D (Nottingham), MNSE, R.Eng (1338)	Power Systems	Senior Lecturer
9.	Dr. A. N. Ikot	B.Sc., M.Sc., Ph.D	Electromagnetism	Senior Lecturer
10.	Dr. J. J. Biebuma	B.Sc, M. Sc. (Sussex), Ph.D (Southern Cahtorma), PGDE (UPH), CISD, MNISE	Telecommunication	Senior Lecturer
11.	Engr. Dr. R. Uhunmwangho	B.Sc, (Lasi) M.Tech (RUST), Ph.D (RUST), MNSE (07721), R Eng (11453), SMIEEE, MNIM	Power Systems/ Electrical Machines	Senior Lecturer
12.	Engr. Dr. U. A. Kamalu	B. Eng, M.Sc., Ph.D, (FUTO) MNSE (06968), R.Eng (7123)	Electronic/ Computer Engineering	Senior Lecturer
13.	Engr. Dr. B. O. Omijeh	B.Eng, M.Eng, Ph.D MNSE(18,380), R.Eng	Computer/ Communications	Senior Lecturer

		(15,557)	Engineering	
14.	Dr. Prince O. Asagba	B.Sc, M.Sc, Ph.D	Computer Science	Senior Lecturer
15.	Dr. Onyejegbu Laeticia Nneka	B.Sc (Physics), PGD (Computer), M.Sc (Computer), Ph.D (Computer)	Computer Science	Senior Lecturer
16.	Engr. Dr. E. K. Okedu	B. Eng, M. Eng, Ph.D, MNSE (28,504), R.Eng (26,092), MIEEE	Electrical/Electronic Engineering	Senior Lecturer
17.	Engr. Dr. E. Omorogiuwa	B.Eng, M.Eng, Ph.D (Uniben), MNSE (23,241), R.Eng (24,523)	Power and machines	Senior Lecturer
18.	Dr. E. Ogheneovo	B.Sc., M.Sc., Ph.D	Computer Science	Senior Lecturer
19.	Engr. Dr. V. I. Nnebedum	B. Eng, M.Eng, Ph.D, MNSE (06838), R.Eng (26,032), MIEEE (905,9051), MNCS (03215)	Computer/ Communications Engineering	Lecturer 1
20.	Engr. G. O. Ajabuego	B.Eng, M.Eng, MNSE (11,176), R.Eng (12,611)	Power and machines	Lecturer I
21.	Engr. J. N. Dike	B.Eng, M.Eng, MNSE (15,535), R.Eng(12,522)	Electrical/Electronic Engineering	Lecturer I
22.	Engr. N. O. Ogbogu	B.Eng, M.Eng, MNSE (16,932), R.Eng (13,867)	Power and machines	Lecturer I
23.	Dr. A. A. Eteng	B.Eng, M.Eng, PhD MNSE (24,165), MIEEE, MIET	Communications Engineering	Lecturer I
24.	Engr. Dr.(Mrs.)N. O. Nwazor	B.Eng, M.Eng, PhD MNSE (24,722), R.Eng (22,436)	Computer and Control Systems Engineering	Lecturer I
25.	Engr. C. S. Esobinenwu	B.Sc(ED), B.Tech (RSUST), M.Eng (UPH), MNSE(29,003), R.Eng (28,458)	Power and machines	Lecturer II
26.	Engr. (Mrs.) I. B. Asianuba	B.Tech, M.Eng, MNSE (22,014), R.Eng (23,511), MIEEE (91283185)	Communications Engineering	Lecturer II
27.	Mr. J. C. Ezeofor	B.Eng, M.Eng, MNSE(32,400), R. Eng.(R.30386)	Computer and Control Systems Engineering	Lecturer II

28.	Mr. C. O. Omeje	B.Eng, M.Eng, MNSE (32,451)	Power and machines	Lecturer II
29.	Engr. R. O. Okeke	B.Eng, M.Sc, MNSE (30,437), R.Eng (28,637)	Telecommunications	Lecturer II
30.	Mr. M. Ehikhamenle	B.Eng, M.Eng, MNSE (34,837), R.Eng (32,637)	Electronic/Computer Engineering	Lecturer II

2.4 Technical Staff

Name	**Rank / Designation, Date of First Appointment**	**Qualifications, Membership of Professional Association**	**Duties**
Engr. O. Lamidi	Chief Technologist 2006	B.Eng, M.Eng HND,ANISLT, R.ENG (26,132)	Conduct and supervise laboratory practical work
Mr. O. Ikpela	Senior Technologist 1995	HND, ANISLT	Conduct and supervise laboratory practical work
Mr.V. Ahunanya	Senior Technologist 1988	HND, ANISLT	Conduct and supervise laboratory practical work
Mr. L. C. Ogboda	Technologist I 2006	B.ENG,HND (UNIPORT) ANISLT	Maintenance of laboratory instruments
Mr. E. I. Woke	Technologist II 2013	HND (RIVPOLY) NATE(C-7411)	Organization of students' practical work
Mr.A. N. Enyinda	Technologist II 2013	B.Tech	Organization of students' practical work
Mr. G. A. Ihunwo	Principal Works Superintendent 2008	B.Sc (Tech. Education)	Maintenance of laboratory and office equipment
Mr. D. Idala	Works Superintendent 1990	OND	Maintenance of laboratory and office equipment
Mrs V.S. Emmanuel	Head Laboratory Attendant 1995	FSLC	Laboratory cleaner

Miss.E. Etuk	Laboratory Assistant 2013	SSCE	Laboratory assistance
Mr.S. Syder	Technologist II	HND(UNICAL)	Laboratory assistance

2.5 Administrative Non-Teaching Staff

Name	**Rank / Designation, Date of First Appointment**	**Qualifications, Membership of Professional Association**	**Duties**
Miss M.E.Adingupu	Assistant Registrar 1998	B.Sc, PGD, M.Sc	Administrative duties
Mrs M. A. Peter	Confidential Secretary I	HND, PGD, MBA	Secretarial function
Mrs. P. Anyanwu	Chief Secretarial Assistant	WAEC	Secretarial function
Mr. P. Fanor	Personal Secretary III	HND, BSc	Secretarial function
Mr. S. C. Mmelisi	Chief Clerical Officer	SSCE	Administrative duties
Mr. O. Igwe	Clerical Officer	SSCE	Administrative duties
Mrs. C. B. Gboro	Clerical Officer	SSCE	Administrative duties
Miss B. A. Peter	Computer Operator	SSCE	Document processing
Mrs E. Osobinuanwu	Caretaker	FLSC	Cleaning/Messenger
Mr. P. Tukuru	Caretaker	FSLC	Messenger
Mrs. B. Echem	Caretaker	FSLC	Messenger/Cleaner

3. ACADEMIC POLICY

3.1 Duration of Degree Programmes

The Department shall run Bachelor's Degree programmes of 5 years in Electrical/Electronic Engineering.

3.2 Framework for Degree Structure

The general framework for the undergraduate degree structure is as follows:

1st Year	2nd Year
General Studies Course Foundation Courses	General Studies Courses (where applicable), Foundation Courses, Major Courses, Community Service Course, Elective Courses (where applicable), Teaching Practice (where applicable)

3rd Year	4th Year
General Studies Courses Major Courses Elective Courses (where applicable) Industrial Training/Teaching Practice/Year Abroad	General Studies Courses Major Courses Elective Courses (where applicable) Industrial Training (where applicable) Seminar Course (where applicable) Projects (where applicable)

5th Year
Major Courses
Elective Courses
(Where applicable)
Seminar Course
(Where applicable)
Projects (where applicable)

3.3 GENERAL OBJECTIVES OF COURSES

All courses offered shall explore:

- New development in technology, policy and process;
- New concepts and practices in education for sustainable development;
- As much as possible, courses should address regional, national and global perspectives and consider issues bordering on development and growth, unemployment and employability, energy crises, etc.

3.4 CATEGORIES OF COURSES

General Studies Courses

General Studies Courses (GES) are University-wide courses at appropriate levels of the degree programme, the purpose of which shall be to improve the basic intellectual, analytical ability, communication and entrepreneurial skills of the students and to promote a continuous awareness and understanding of

contemporary society as well as the historical and cultural origins of the peoples of Nigeria. General Studies Courses (GES) must be passed.

Foundation Courses

These are common courses in the same Faculty (Faculty-wide Courses) from which all students shall take an approved selection in at least the first year, the purpose of which shall be to provide a sound background in general principles and methodology relating to the disciplines in the Faculty. Various Foundation (Faculty-wide) courses are prescribed by each Department.

Major courses

These are courses in the student's major field of interest. Courses in major disciplines occupy most of the curriculum in the third and subsequent years of the regular five-year structure. All students are advised to be acquainted with the requirements of their Department/Faculty.

Elective Courses

Elective courses offer some opportunities to students to broaden their interests and to meet the required credit unit,

either within or outside their major disciplines. Subject to the advice of their academic advisers, students are encouraged to follow their personal interests in electives.

Audited Courses

A student may choose to audit some courses either within or outside his major discipline in order to broaden his interest. Audited courses are not used in calculating the student's cumulative grade point average, but may be included in the transcript provided that the student registered for the courses and sat for the prescribed examinations.

Community Service Course

This is a field project directed towards service to the community or to the University and is an integral part of all degree programmes. The objective of the project is to involve both staff and students in a practical way with some of the problems of society as well as with efforts to provide solutions to them, and to inculcate and develop in both staff and students a consciousness of their responsibilities to society and the satisfaction of rendering service to others.

The projects, which are practical in nature, require the application of some of the skills being acquired in the degree programme to serve the community and involve manual work. They are credit-earning and area essential requirement for all degree programmes. The Director of Community Service shall approve all projects.

The Community Service Course must be passed.

3.5 GUIDELINES FOR COURSE SYSTEM AND INSTRUCTION

1. For purposes of teaching and examination, the academic year is divided into two semesters, each of approximately sixteen weeks.
2. Instruction shall be by courses and every proposed course with an outline of contents must be presented to the Senate of the University for approval.
3. The unit of credit for a course is the credit unit (CU), one credit unit being when a class meets for one hour every week for one semester in a lecture or tutorial, or for 3 hours every week in practical in the laboratory, workshop or fieldwork.

4. Each course carries 1 to 3 credit units, and its duration is normally one semester, except Final Year Project and Industrial Training (Student Industrial Work Experience Scheme – SIWES).
5. The normal course load for a full-time student is 15 to 24 credit units per semester. No student is permitted to register for less than 15 or more than 24 credit units in any semester. This does not apply to students on fieldwork/industrial attachment/teaching practice during vacation periods and those in the Faculty of Law (where the maximum credit unit is 28 for law students).
6. For each course, students shall be continuously assessed and examined at the end of the semester in which the course is given.
7. Re-sit examinations are not permitted in the degree programmes in the University /Department.
8. Students are required to obtain a minimum of 75% attendance at lectures/tutorials and/or laboratory/practical sessions to be eligible for examination in the courses.

3.6 GENERAL REQUIREMENTS FOR THE AWARD OF A DEGREE

1. To obtain a degree in the University of Port Harcourt, students must complete the approved programme of study in their Department, and satisfy all graduation requirements as specified in the relevant programmeof the University. All students are urged to familiarize themselves with the graduation requirements of their respective departments, as specified in the current brochure for their Departments/Faculties.

2. It is the responsibility of each Faculty/Department to ensure that copies of the brochure with correct details of all current programmes are available to incoming students.

3. Students will normally graduate on the programme which was in effect in their Department at the time they were admittedto the Department, except the Senate of the University directs otherwise.

4. The pass mark for undergraduate courses is 40%.

5. When re-registering failed courses, students must not exceed the maximum number of 24 credit units for one semester. Any course(s) which would cause the maximum to be exceeded must be deferred to the following academic year.

6. Students are not allowed to repeat courses which they have passed.

7. It is mandatory that a student presents and defends his/her project to earn a degree.

3.7 CRITERIA FOR GRADUATING STUDENTS

1 Students may be allowed to graduate with a maximum of any two (2) failed courses, provided these are not Foundation courses, Major courses, Research Projects, Design Project, Teaching Practice, Student Industrial Work Experience Scheme (SIWES), GES Courses, Year Abroad Programme and Community Service Course. **This does not apply to students of Engineering, Medicine, Dentistry and Pharmaceutical Sciences.**

2 The following courses must be used in computing the degree results namely: Research Projects, Design Project,

Teaching Practice, Student Industrial Work Experience Scheme (SIWES), GES Courses, Year Abroad Programme and Community Service Course.

3 Each Department will specify its minimum requirements for the award of its degrees, subject to a minimum of 120 credit units and a maximum of 148 credit units for a 4-year programme, or a minimum of 150 credit units and a maximum of 210 credit units for a 5-year programme. For direct entry admission, the minimum credit units shall be 90 for a 4-year programme and 120 for a 5-year programme.

4 Each Department shall publish in its brochure the specified minimum credit units and courses that are compulsory for the award of a degree in the Department.

5 Pass grade(s) shall replace fail grade(s) and the passing grade(s) shall be used to compute the CGPA. The maximum grade to be earned in respect of replacement of fail grade with a Pass grade is “C”.

6 The Official Transcripts shall record all the courses taken by the student.

7 Only the Registry shall issue academic transcripts of the University.

3.8 ACADEMIC ADVISERS

1 The Head of every department shall assign every student to an academic adviser who is a member of the academic staff who will advise him/her on academic matters. Academic advisers are expected to follow their students' academic progress and provide counselling to them.

2 Academic Advisers should give explicit information about appropriate times at which they will be available to students who wish to consult them.

3.9 REGISTRATION OF COURSES

1 The period for normal registration is the first three weeks of each academic year, excluding the orientation week or as adjusted by the appropriate authorities of the University.

2 Course registration is the responsibility of the student's parent Department or Faculty/College as the case may be. General Studies courses shall also be registered at the School of General Studies. The Head of

Department/Academic Adviser should guide the students on the courses to register.

3 In registering students, the parent department should ensure that students re-register all previously failed courses. Furthermore, the total credit units registered should not be less than 15 or more than 24 per semester.

4 Registration of courses is online, after that, the student should submit a copy of his/her Course Registration Printout to the Head of Department or any other officer designated for that assignment. ***Note that the processes must be completed six (6) weeks upon resumption.***

5 The registration portal will be shut down one month to the first semester examination. Therefore, any student who fails to pay his/her school charges and register his/her courses online one month to the First Semester examination in a session loses his/her studentship for that session. Note that the lost session shall form part of the total duration allowed for the programme.

6 Students are not allowed to sit for examinations in courses for which they have not previously registered.

Such actions are fraudulent, and culprits will be appropriately disciplined.

7 Only results of bonafide students (that is, those who have paid their school charges and registered their courses online) will be published online.

8 A list of students who registered for each course should be kept. This list should be displayed for one week immediately after the close of registration for necessary corrections.

9 The Parent Faculty and the parent Department will retain one copy each of this list and forward copies to the Teaching Faculty is distributed as follows: one to the Faculty, one to the Department and one to the Course Lecturer. This list becomes the official register for the course examination.

11 Application for adding or dropping a course must be made on the prescribed ADD/DROP form after obtaining the approval of the Head of Departments concerned, not later than four weeks after the commencement of lectures. Any change of course made by altering the hard copy of the course registration form will be null and void.

3.10 TIME TABLES

1. The lecture timetable should be released at least two weeks before the first day of lectures. For large classes, the different streams shall be allocated the same slot on the timetable and the streams taught in parallel classes running at different venues.

2. The examination timetable shall be released at least three weeks before the scheduled date of the start of examinations.

3. Examinations involving University-wide or Faculty-wide courses shall be conducted in the first week of examinations. At the time of such examinations, no other examination shall be scheduled, so as to enable enough space and invigilators to be available.

4. Scheduled times and dates for examinations must be adhered to. If it is found necessary to reschedulean examination, this must be with the permission of the Chairman, Timetable Committee and the Provost or Dean of the Faculty.

3.11 TEACHING

1. Large classes shall be co-taught, and no class shall exceed 500. The assignment of lecturers to teach the different streams of students in any of these large classes shall be done at a properly constituted Departmental Board meeting of the parent department.

2. The co-ordination and the teaching of Faculty and University-wide courses involving freshmen should be restricted to senior academic staff, not below the rank of Senior Lecturer.

3. Heads of Departments should ensure that lecturers take their teaching assignments seriously. In particular, course outlines based on the approved course descriptions must be made available to the students free of charge at the commencement of lectures.

4. Continuous assessment normally constitutes 30% of the marks for the course. The continuous assessment must be administered during the teaching period and not as a test immediately preceding the examination or as an extra question on the examination paper.

3.12 GRADING SYSTEM

1. The following system of grade points shall be used:

MARK/SCORE	LETTER NOTATION	GRADE POINT
70% and above	A	5.00
60 – 69	B	4.00
50 – 59	C	3.00
45 – 49	D	2.00
40 – 44	E	1.00
0 – 39	F	0.00

2 Students are obliged, to sit for examinations in all registered courses. Any student who fails to sit for a course examination without satisfactory reason earns the grade of 'F' and must re-register for the course.

3.13 COMPUTATION OF GRADE POINT AVERAGE

1 Every course carries afixed number of Credit Units (CU), one Credit Unit being when a class meets for one hour every week for one semester, or three hours every week in the laboratory, workshop or field.

2 Quality points (QP) are derived by multiplying the Credit Units for the course by the Grade Points earned by the student: e.g. in a course with 3 Credit Units in which a student earned a B with 4 Grade Points; the Quality Point is 3 x 4=12.

3 Grade Point Average (GPA) is derived by dividing the Quality Points for the semester by the Credit Units for the semester: e.g. in a semester where the student earned 56 Quality Point for 18 Credit Units, the GPA is 56 ÷18 = 3.11.

4 Cumulative Grade Point Average (CGPA) is derived by adding the Total Quality Points (TQP) to date and dividing by the Total Credit Units (TCU) to date: e.g. if the TQP is 228 and the TCU is 68, then the CGPA is 228 ÷ 68 = 3.35.

5 Detailed example of how to calculate GPA and CGPA are shown below:

FIRST YEAR, SEMESTER ONE

COURSE	Credit Unit Units	Letter Grade	Grade Points	Quality Points	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
HSA 100	3	B	4	12	QP = 66	TQP = 66
HSA 101	2	C	3	6	CU = 17	TCU = 17
HSA 102	1	C	3	3	GPA =	CGPA = 66+17
HSA 103	4	B	4	16	66÷17	=3.88
HSA 104	5	A	5	25	=3.88	
HSA 105	2	D	2	4		
TOTAL	17			66		

FIRST YEAR, SEMESTER TWO

COURSE	Credit Units	Letter Grade	Grade Points	Quality Points	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
HSA 106	5	E	1	5	QP = 48	TQP = 114
HSA 107	4	D	2	8	CU = 17	TCU = 34
HSA 108	5	B	4	20	GPA=	CGPA =
HSA 109	0	F	0	0	48÷17	114 ÷34
HSA 110	3	A	5	15	=2.82	=3.55
TOTAL	17			48		

SECOND YEAR, SEMESTER ONE

COURSE	Credit Units	Letter Grade	Grade Points	Quality Points	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
HSA 210	2	E	1	2	QP = 61	TQP = 175
HSA 211	3	C	3	9	CU = 18	TCU = 52
HSA 212	5	B	4	20	GPA =	CGPA =
HSA 213	5	C	3	15	61 ÷18	175÷52
HSA 214	3	A	5	15	=3.39	=3.37
TOTAL	18			61		

SECOND YEAR, SEMESTER TWO

COURSE	Credit Units	Letter Grade	Grade Points	Quality Points	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
HSA 215	3	B	4	12	QP = 59	TQP = 234
HSA 216	4	C	3	12	CU = 18	TCU = 70
HSA 217	5	B	4	20	GPA =	CGPA=
HSA 218	0	F	0	0	59 ÷18	234 ÷70
HSA 219	3	C	3	9	=3.28	=3.34
HSA 109	3	D	2	6		
TOTAL	18			59		

Note: HSA 109 has been passed in Second Year, Semester Two. The CU is therefore used in the year the candidate passed and the failure in Year One Semester Two computed as 0 credit unit.

THIRD YEAR, SEMESTER ONE

COURSE	Credit Units	Letter Grade	Grade Points	Quality Points	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
HSA 300	3	B	4	12	QP = 51	TQP = 285
HSA 301	3	C	3	9	CU = 14	TCU = 84
HSA 302	0	F	0	0	GPA =	CGPA=
HSA 303	4	B	4	16	51 ÷14	285 ÷84
HSA 304	2	A	5	10	= 3.64	= 3.39
HSA 305	2	D	2	4		
TOTAL	14			51		

THIRD YEAR, SEMESTER TWO

COURSE	Credit Units	Letter Grade	Grade Points	Quality Points	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
HSA 310	3	D	2	6	QP = 55	TQP = 340
HSA 311	3	C	3	9	CU = 18	TCU = 102
HSA 312	3	E	1	3	GPA =	CGPA=
HSA 313	4	B.	4	16	55 ÷18	340 ÷ 102
HSA 344	3	A	5	15	= 3.06	= 3.33
HSA 315	0	F	0			
HSA 218	2	C	3	6		
TOTAL	18			55		

Note: Candidate passed HSA 218 in the Third Year Semester Two and passed HSA 302 in Fourth Year Semester One, candidate passed HSA 315 in Fourth Year Semester Two, the CU of the failed courses were used in the respective years/semester that the candidate passed the failed courses.

FOURTH YEAR, SEMESTER ONE

COURSE	Credit Units	Letter Grade	Grade Points	Quality Points	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
HSA 400	3	A	5	15	QP = 63	TQP = 403
HSA 401	3	C	3	9	CU = 20	TCU = 122
HSA 402	3	B	4	12	GPA =	CGPA=
HSA 403	4	C	3	12	63 ÷20	403 ÷122
HSA 404	2	E	1	2	= 3.15	= 3.30
HSA 405	2	D	2	4		
HSA 302	3	C	3	9		
TOTAL	20			63		

FOURTH YEAR, SEMESTER TWO

COURSE	Credit Units	Letter Grade	Grade Points	Quality Points	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
HSA 410	3	B	4	12	QP = 88	TQP = 491
HSA 411	3	D	2	6	CU = 25	TCU = 147
HSA 412	3	C	3	9	GPA =	CGPA=
HSA 413	4	B	4	16	88 ÷25	491 ÷147
HSA 414	3	A	5	15	= 3.52	= 3.40
HSA 415	6	B	4	24		
HSA 315	3	D	2	6		
TOTAL	25			88		

6. Grades obtained in all approved courses of a student's prescribed programme, excluding audited courses, shall be used to compute the GPA.

7. When a student transfers from one Faculty to another, only the grades obtained in the courses in the new

programme of study will be used to compute the CGPA. Courses which were completed before the change of programme and which are not part of the new programme will be treated as audited courses.

8. When a student transfers from another University, only the grades obtained at the University of Port Harcourt will be used to compute the CGPA.

3.14 CONTINUATION, PROBATION AND WITHDRAWAL

1. **Continuation Requirement**

   The continuation requirement for undergraduate students in the University is a CGPA of 1.50 at the end of every academic year.

2. **Probation**

   Probation is a status granted to a student whose academic performance falls below an acceptable standard. A student whose Cumulative Grade Point Average is below 1.50 at the end of a particular year of study earns a period of probation for one academic year.

3. **Advised-Withdrawal From Programme**

   A student whose Cumulative Grade Point Average is below 1.50 at the end of one year's probation shall be

required to withdraw from the programme. However, to minimize waste of human resources, consideration should be given to withdraw from the programme of study and possible transfer to other programmes within the University; provided CGPA is not below 1.00. Moreover, the student shall meet the Departmental and Faculty requirements concerning UTME subjects, UTME score and relevant O-Level credits. The Faculty/Department must be willing to accept the student. *Students transferring from Medicine, Dentistry and Pharmaceutical Sciences to the Faculty of Science under this condition must have a continuation CGPA of 2.00.*

4. **Limitation of Registration**

Students on probation cannot register more than 15 units per semester. The purpose of the restriction is to give the students a chance to concentrate on improving their performance.

5. **Warning of Danger of Probation**

Students should be warned by their Department if at the end of any semester their GPA falls below 1.50.

6. **Repeating Failed Course(s)**

Subject to the conditions for advised-withdrawal from the programme and or probation, a student must repeat the failed course(s) at the next available opportunity, provided that the total number of credit units carried during that semester does not exceed 24.

7. **Temporary Withdrawal from study**

(i) Any student who has a genuine reason(s) to apply for temporary withdrawal from the study should apply to the University in writing through the Department and Faculty/College stating the reason (s) for his/her application, and needs to obtain approval from Senate.

The application should specify the period (session) to be away and the session for the resumption of study. The Head of Department of the student should furnish the Faculty with the CGPA of the student at the time of the request, and this must be presented to the Senate of the University.

(ii) **Temporary withdrawal on grounds of ill-health**

Any student who seeks to proceed with temporary withdrawal on grounds of ill-health should write and inform the University within 30 days of the onset of the ill-health or, depending on the circumstance,

expeditiously, providing relevant papers from the Director of Health Services of the University.

(iii) **Deemed withdrawal**

At the end of every academic year, any student who has been found to be absent from the University without permission will be treated as having withdrawn from the programme. Such a student may be re-admitted upon application to the Senate of the University through the Department/Faculty, showing the acceptable reason for re-admission.

8 **Resumption of Studies**

The student should notify the University at the time he/she resumes studies with evidence of approval of temporary withdrawal from studies.

9 (i) **Taking Examination as First Attempt**

Any student who takes ill and goes into the hospitalduring the examination should write and inform the University and attach the original of the Medical Report(s). The application to sit for the missed examination as the first attempt should indicate the course(s), semester and session involved. The medical report(s) should be authenticated by the Director, Health Services Department of the

University. After that, the application will be considered by the Departmental and Faculty Boards respectively and recommended to Senate for approval.

(ii) P**ermission to Be Away During Examination while Representing the University**

Any student who goes to represent the University in an approved and authorised competition should notify his/her Department through the Dean Student Affairs before leaving. In such a situation, on return, the Department should conduct all missed tests/examinations for the student.

10 **Duration of Degree Programmes**

The maximum length of time that a student shall be permitted to spend on a standard 4-year programme shall be 6 years, and on a 5-year programme, it shall be 7 years. In Part-Time Programmes, including Open Distance and e-Learning (ODeL), the appropriate ratio should apply. A student who after the maximum length of time allowed for a degree programme, has not obtained a degree shall have his degree result calculated on fail out basis.

This does not apply to the Medicine, Dentistry, Pharmaceutical Sciences and Post Graduate programmes, which have their requirements.

3.15 CLASSIFICATION OF DEGREES

The Bachelor's degree of the University of Port Harcourt shall be awarded as 1st Class, 2nd Class Upper, 2nd Class Lower, or 3rd Class Honours, (or as a Pass degree for Old Students*). The Cumulative Grade Point Averages for these classes shall be:

CLASS OF DEGREE	CUMULATIVE GRADE-POINT AVERAGE	
	OLD STUDENTS	NEW STUDENTS
1st Class	4.50 - 5.00	4.50 - 5.00
2nd Class Upper	3.50 - 4.49	3.50 - 4.49
2nd Class Lower	2.40 - 3.49	2.40 - 3.49
3rd Class	1.50 - 2.39	1.50 - 2.39
Pass	1.0 - 1.49	

**Old Students are those enrolled in second or higher level course before the 2015/2016 session*

New students are those enrolled in the first year of the degree programme in the 2015/2016 session and after that. In line with the directive of the National Universities Commission (NUC), with effect from the new intake of 2015/2016 academic

sessions, the classification of First Degree in Nigerian Universities terminates at Third Class. In other words, "Pass" Degree has been abolished.

3.16 EXAMINATION REGULATIONS

1. Except as otherwise herein stated in this Regulation, the following terms shall mean**:**
   i. Invigilators: These are those who conduct examinations.
   ii. Supervisor: This is the most senior lecturer among the Invigilators
   iii. Examiners: These are the course lecturers.
   iv. Examination Officer(s): The examination officer(s) oversees the conduct of all examinations in the Department and uploads Senate approved results on the University portal.

2. Examiners should ensure that the question papers are prepared under conditions of maximum security and are ready on time. For all examinations, well-packaged question papers must be accompanied by a list of Supervisors. Invigilators and the relevant forms. The Examiners should ensure that the question papers, adequately packaged and sealed, are submitted to the Supervisor, at least, one hour before the start of the examination.

3. Subject only to administrative supervision by the Office of the Provost/Dean/Director, the conduct of course examinations shall be the responsibility of the Head of Department. The Head of Department should ensure that

examination questions are moderated within the Department.

4. For each examination, there should be a Supervisor and sufficient Invigilators, including both male and female Invigilators.

5. It is the responsibility of the Parent Department to appoint Supervisors and Invigilators. The list should be forwarded to the Head of the Teaching Department not later than one week before the commencement of semester examinations. Students should be seated according to their Departments, and they should be invigilated by academic staff from their Departments.

6. Supervisors should be appointed from the rank of Senior Lecturer, and above and Invigilators should be other members of academic staff. Part-time teachers, where necessary, are also regarded as Examiners.

7. Supervisors must identify and check students into the examination hall using the authenticated register of students for that course. The student must show the invigilator his/her registration/identity card on entry to every examination. He/she must leave this on the desk throughout the examination for easy inspection by the invigilator.

8. All examination scripts used by the students must be endorsed by the Supervisor at least 30 minutes after the commencement of the examination.

9. The Invigilator must ensure that no student removes from the examination venue any paper or other examination material except the printed question papers where it is allowed. Answer booklets are the property of the University and must not be in the possession of students.

10. During examinations, the security department should beef up security especially around the examination centre to ensure that those not involved in the examination are not allowed to loiter around the examination halls.

11. No unregistered student is authorized to take any examination.

12. A student should be in the examination room at least 30 minutes before the start of the examination. A student who is up to 30 minutes late shall be admitted, but shall not be given any extra time. A student who arrives more than 30 minutes after the start of the examination shall not be admitted. A student may be allowed to leave the examination room temporarily before the end of the examination, but must NOT:

    (a) do so during the first hour of the examination except in cases of emergency like illness;

(b) do so unaccompanied OR with his/her scripts.

13. Students must write their names, Matriculation numbers/Registration numbers and sign the attendance register within the first hour of the examination.

14. Students must write their Matriculation numbers/Registration numbers (not name) at the appropriate places on the cover and pages of the answer booklet.

15. No student shall bring in any handbag, mobile phone, briefcase, books, notebooks, or papers, etc. into the examination hall.

16. No student shall directly or indirectly give or accept any assistance during an examination.

17. Students shall stop writing at the end of the allotted time for an examination at the instruction of the Supervisor or Invigilator(s).

18. Students shall avoid communicating with each other or with any other person during an examination except with the Invigilator/ Supervisor if necessary.

19. Anybody who disrupts an on-going examination shall face appropriate disciplinary action.

20. At the end of the examination, the Supervisor/Invigilator shall ensure that the answer scripts are checked, properly packaged, and returned along with relevant forms to the Examiner.

21. A member of staff who fails to turn up for invigilation shall be queried for this act in the first instance. If this is repeated during another period of examination, the member of staff will lose the next promotion and be warned in writing by the Vice Chancellor.

22. The Head of Department shall report any defaulting Invigilator to the Provost/Dean, whose responsibility it is to forward the report to the Vice Chancellor.

23. These examination regulations apply to all students studying for the award of University of Port Harcourt Degree, Certificate and Diploma.

3.17. **RESULTS**

1. Duly signed and Senate approved semester results should be distributed as follows: copy to the course lecturer(s), copy to the Head of Department(s), and two copies to the Office of the Provost/Dean.

2. All results must be published provisionally on-line not later than 24 hours after the Faculty Board has considered them.

3. An internal moderator for an examination must have access to the question papers and the answer scripts. The course mark sheets must show an itemized distribution of the scores.

4. Computation of result should be restricted to academic staff duly appointed by the Head of Department who are members of Departmental Results Verification Committee.

5. Faculty Officers, Heads of Departments and Provost/Deans/Directors should ensure that results are treated as high-security documents. A copy of the mark sheets (Electronic copies on PDF and MS Excel as well as the hard copies) of all the courses should be sent to the Director, Academic Affairs for the preparation of students' transcripts.

3.18 EXTERNAL MODERATION OF DEGREE EXAMINATION

1. An ExternalExaminer, who shall normally be of the rank of a Professor, shall be nominated by the Departmental Board and approved by Senate, to moderate all final year degree results.

2. The appointment shall be for one year in the first instance and may be renewed for another one year only. He or she may not be re-appointed until after two years have elapsed.

3. The External Examiner shall conduct an oral examination of final year projects.

4. After due consideration of all results and projects, the External Examiner shall sign all final year Degree Spreadsheets.

5. The External Examiner shall forward a written report of the examination exercise to the Vice Chancellor.

3.19. PROCEDURE FOR CHANGE OF RESULTS

1 Senate approved results mightbe reviewed as a consequence of the discovery of an error or fraudulent change in the scores previously recorded.

2 No result/grade approved by the Faculty Board shall be changed without reference to the Faculty Board.

3 No result/grade approved by Senate shall be changed without reference to Senate.

4 Any application for a correction or change of results/grades shall be made in writing to the Head of Department, giving clearly defined reasons for the correction or change.

5 The result(s)/grade(s) suspected to be fraudulent, should be subjected to the inquiry at the appropriate level and a recommendation made to Senate.

3.20 PROCEDURE FOR THE REVIEW OF SCRIPTS OF AGGRIEVED STUDENTS

1. Any student who is not satisfied with his/her grades is entitled to see his/her marked examination scripts if he/she so desires, provided appropriate steps are taken to safeguard the scripts.

2. Any student who is aggrieved about the grading of a course examination may apply in writing to his/her Head of Department. The Head of Department shall refer the application to the Dean of the Faculty, who shall cause the script(s) to be re-assessed and the scores presented to the Faculty Board for determination.

3. A student applying for a review of answer scripts shall be required to pay the approved fee to the Bursary Department before the commencement of the review. This shall be exclusive of the cost of postage of the documents to be reviewed and honorarium to the reviewer where applicable.

4. If the appeal results in a significant improvement (i.e. a change in letter grade) on the student's original grade, the fee so paid shall be refunded to the student within 60 days from when Senate approved the new result.

5. Application for review of answer scripts must be made not later than one month from the date of publication of provisional results by the Faculty.

6. The application must be personal. No surrogate or group appeal shall be entertained.

3.21 PROCEDURE FOR INVESTIGATION OF EXAMINATION MALPRACTICES

1. Definition of Examination Malpractice

Examination malpractice refers to all forms of cheating which directly or indirectly **falsify** the ability of the student. These include cheating within or outside an examination hall and any involvement in all other examination-related offences. Various forms of cheatingare categorized below:

A. Cheating Within an Examination Hall/Room

1. Copying from one another/exchanging question papers/answer sheets
2. Bringing in prepared answers, copying from textbooks, notebooks, laboratory manuals or any other instructional aids smuggled into the examination hall.
3. Collaboration with an invigilator/lecturer where it involves the invigilator/lecturer providing written/oral answers to a student in the examination hall.
4. Oral/written communication between/amongst students.
5. Having prepared answers written on any part of the body.
6. Receiving information, whether written or oral, from any person(s) outside an examination hall.
7. Refusal to stop writing at the end of the examination.

8. Impersonation.
9. Non-submission of answer scripts at the end of an examination or removal of answer scripts from the examination hall.
10. Sitting for an examination for which the student is not qualified as a result of manipulation of registration forms
11. Entering an examination hall/room with an electronic device, e.g. handset/mobile phone, i- pad, i-pod, etc., except non-programmable calculators, whether it has been used to cheat or not.

B. Cheating outside the examination hall/room

1. Plagiarism is the use of either another person's or one's work without appropriate acknowledgement both in the text and in the references at the end. It is, therefore, a form of examination malpractice.
2. Colluding with a member of staff or on his/her initiative obtaining set questions or answers beforehand.
3. Colluding with a member of staff or on his/her initiative modifying students' scorecards, answer scripts and/or mark sheets.
4. Colluding with a member of staff to submit another answer script as a substitute for the original answer script after an examination.
5. Writing of projects, laboratory and/or field reports on behalf of a student by any other person(s).
6. Copying laboratory and fieldwork reports and/or term papers or other related materials.

7. Breaking into a staff office or departmental office to obtain question papers, answer scripts or mark sheets or substituting a fresh answer script for the original script.

C. Other Examination Related Offences

1. Producing a fake medical certificate.
2. Assault and intimidation of an invigilator/supervisor/examiner within or outside the examination hall.
3. Attempting to destroy and/or destroying evidence of examination malpractice.
4. Intimidation/threats to extort sex/money/other favours from students by a member of staff in exchange for grades.
5. Offering favours (money, sex, etc.) to the invigilator by a student to cover up the offence.
6. Refusing to co-operate with the Faculty Investigating Panel or the Senate Committee on Examination Malpractice.

D. Alternatively, any other act that may be sufficient to undermine the credibility or integrity of the examination.

It should be noted that any student or staff found guilty of any of the above-listed malpractices shall be deemed to be guilty of gross misconduct.

2. Investigation Of Examination Malpractice

1. Any unauthorized material found in the possession of a student during an examination shall be seized by the Invigilator, and the student shall be made to sign on such

unauthorized material in acknowledgement that it was retrieved from him/her. Refusal to sign is tantamount to acceptance of guilt.

2. Where the student refuses to sign, the Invigilator shall make a clear statement on the answer sheet and sign.

3. The student shall, however, not be prevented from finishing the examination.

4. The Invigilator shall, immediately after the examination, submit a written report to the Head of the Department conducting the examination.

5. The report shall include all necessary information.

6. The Department conducting the examination shall set up a committee/panel to examine the merit of the case within one week after the examination.

7. If the Departmental Board feels that a prima facie case has been established, the case shall be presented to the Faculty/College Board, which shall appoint a panel to investigate the case and report back to the Faculty/College within one month from when the case was presented.

8. If the Faculty/College is satisfied that a case has been established, the case shall be reported to the Senate Committee on Examination Malpractice (SCEM).

9. The Senate Committee on Examination Malpractice (SCEM) shall investigate the case and report to Senate for decision.

10. The investigation of examination malpractice cases should be done without delay, and must not go beyond the end of the next semester following the one in which the offence was allegedly committed. Meanwhile, the student(s) allegedly involved in an examination malpractice shall be allowed to register for courses and take examinations in them, but the results thereof shall be withheld pending the outcome of the investigation and decision of Senate.

3.22 PUNISHMENT FOR EXAMINATION MALPRACTICE

1 Any student found guilty of any form of examination malpractice as listed in all the categories of Regulation 3.21 shall be expelled from the University.

Note:

(i) The University shall communicate Senate decisions on examination malpractice to all affected students and their sponsors in writing and after that shall have the information published on all notice boards within the University, University weekly, University website and maybe in the print media.

(ii) Decisions of Senate on examination malpractice shall take effect from the date on which they were taken except otherwise stated.

2. A member of staff involved in aiding and abetting students in examination malpractice amounts to gross misconduct and shall be made to face appropriate disciplinary sanctions.

3.23 SECRET SOCIETIES/CULTS

Secret societies/cults are anti-social and are banned by the University. Membership of secret society/cult group may be shown by any of the following, amongst others:

(i) Dress code
(ii) Fraternity insignia on clothes; on mobile phones and body as tattoo
(iii) Confirmed text messages on cult activities such as a schedule of meetings and venues, general information to fraternity members, agenda for initiation, etc.
(iv) Physical recruitment drives and forceful initiation
(v) Telephone chats among members and wooing potential members.
(vi) Pictures showing peculiar greeting pattern of the particular fraternity.
(vii) Snatching of cell phones with demands for ransom and conditional release

(viii) Confirmed sympathizer of cult groups through verbal comments and financial support to cult related events.

4.0 CURRICULUM

4.1 Course Structure and Course Schedule

The Department runs a five-year undergraduate programme leading to the award of a Bachelor's Degree in Electrical/Electronic Engineering (**B. ENG.).** Generally, the programme can be divided into two broad areas:- Basic Engineering Courses and Core Engineering Courses

- **Basic-Engineering Courses:** This covers courses taken in years one and two. These are general foundation courses for all engineering disciplines. This programme is dominated by common Science, General Studies and Engineering courses required by all engineering students.
- **Core Engineering Courses**: This covers courses taken from year three to year five. The courses taken at this level are professional engineering courses mainly from within the Faculty of Engineering.

Apart from these, the students undertake 3-month industrial training at the end of their year three and 6 months industrial training in the second semester of year 4. During the industrial training period, the students are supervised by both lecturers and industry-based supervisors Details on the individual programmes of study/course schedule and course descriptions, are presented below. The Faculty common courses denoted as ENG courses, the General Studies courses (denoted as GES courses), and the Science courses (denoted as CHM for Chemistry; MTH for

Mathematics; and PHY for Physics). The departmental course codes are EEE for Electrical/Electronic Engineering

4.2 Electrical/Electronic Engineering Programme

Year One

First Semester				
Course Code	Course Title	L	P	C
GES 100.1	Communication Skills in English	3	-	3
GES 102.1	Introduction to Logic & Philosophy	2	-	2
CHM 130.1	General Chemistry 1	2	3	3
PHY 101.1	Mechanics & Properties of Matter	3	-	3
PHY 102.1	Physics & Laboratory 1	-	3	1
MTH 110.1	Algebra & Trigonometry	3	-	3
MTH 120.1	Calculus	3	-	3
ENG 101.1	Engineering Drawing 1	1	3	2
Total		**17**	**09**	**20**

Second Semester				
Course Code	Course Title	L	P	C
GES 101.2	Computer appreciation & Applications	2	-	2
GES 103.2	Nigerian Peoples and Culture	2	-	2
CHM 131.2	General Chemistry II	2	3	3
PHY 112.2	Electricity and Magnetism	3	-	3
PHY 103.2	Physics Laboratory II	-	3	1
MTH 124.2	Coordinate Geometry	3	-	3
ENG 102.2	Engineering Drawing II	1	3	2
ENG 103.2	Engineer-in-Society	1	-	1
Eng 104.2	Manufacturing Tech./Workshop Practice	1	3	2
Total		**15**	**12**	**19**

Year Two

First Semester				
Course Code	Course Title	L	P	C
ENG 213.1	Computer Programming for Engineers	2	-	2
PHY 216.1	Vibration, Waves and Optics	3	-	3
ENG 201.1	Engineering Mathematics I	3	-	3
ENG 202.1	Engineering Mathematics II	2	-	2
ENG 203.1	Engineering Mechanics	3	-	3
ENG 204.1	Basic Engineering Materials	2	-	2
ENG 210.1	Basic Electrical Engineering	3	-	3
Total		**18**		**18**

Year Two

Second Semester				
Course Code	Course Title	L	P	C
CHM 240.2	Physical Chemistry	2	3	3
ENG 205.2	Engineering Laboratory 1	-	9	3
ENG 206.2	Engr. Maths III (Differential Equations)	3	-	3
ENG 207.2	Basic Fluid Mechanics	2	-	2
ENG 208.2	Basic Strength of Materials	2	-	2
ENG 209.2	Basic Thermodynamics & Heat Transfer	3	-	3
ENG 211.2	Engineering Lab II	-	3	1
ENG 212.2	Community Service	-	3	1
EEE 222.2	Electrical Engr Drawing/Installation	1	3	2
Total		**13**	**18**	**20**

Year Three

First Semester				
Course Code	Course Title	L	P	C
ENG 301.1	Engr. Mathematics IV	3	-	3
ENG 302.1	Technical Writing and Presentation	2	-	2
EEE 301.1	Electrical Engineering Analysis	3		3
EEE 302.1	Measurement and Instrumentation	3	-	3
EEE 303.1	Electronic Circuits	3	-	3
EEE 304.1	Physical Electronics	3	-	3
EEE 305.1	Electrical/Electronic Engineering Lab. I	-	9	3
Total		**17**	**9**	**20**

Year Three

Second Semester				
Course Code	Course Title	L	P	C
GES 300.2	Fundamentals of Entrepreneurship	2	-	2
ENG 303.2	Engineering Mathematics V	3	-	3
EEE 306.2	Circuit Theory	3	-	3
EEE 307.2	Electromagnetic Fields & Waves	3	-	3
EEE 308.2	Digital Systems Fundamentals	3	-	3
EEE 309.2	Signal Theory and Processing	3	-	3
EEE 310.2	Electrical/Electronic Engineering Lab II	-	9	3
Total		**17**	**9**	**20**

Long Vacation		
ENG 300.3	Industrial Training I	Pass/Fail

Year Four

First Semester				
Course Code	Course Title	L	P	C
ENG 401.1	Engineering Mathematics VI	3	-	3
ENG 402.1	Engineering Economics	2	-	2
EEE 401.1	Control Systems	3	-	3
EEE 402.1	Power Electronics	2	-	2
EEE 403.1	Communication Principles	2	-	2
EEE 404.1	Electrical Machines	3	-	3
EEE 405.1	Electrical Power Principles	3	-	3
EEE 406.1	Electrical/Electronic Engineering Lab. III	-	9	3
Total		**18**	**9**	**21**

Long Vacation				
Course Code	Course Title	L	P	C
ENG 400.2	Industrial Training	-	-	9
GES 400.2	Entrepreneurship Project	-	-	2
Total		**-**	**-**	**11**

Year Five

First Semester				
Course Code	Course Title	L	P	C
ENG 501.1	Professional Practice & Procedures	2	-	2
ENG 502.1	Engineering Management	2	-	2
EEE 501.1	Control Engineering	3	-	3
EEE 502.1	Computer Applications & Data Mgt.	3	-	3
EEE 503.1	Telecommunication Engineering	3	-	3
EEE 504.1	Reliability of Components and Systems	2	-	2
EEE 505.1	Industrial Electronic Design	2	-	2
EEE 506.1	Technical Seminar	-	3	1
Total		**17**	**3**	**18**

Second Semester				
Course Code	Course Title	L	P	C
EEE 5 .2	Elective I	3	-	3
EEE 5 .2	Elective II	3	-	3
EEE 5 .2	Elective III	2	-	3
EEE 513.2	Electrical Services Design	2	-	2
EEE 514.2	Computer Architecture and Organization	3	-	3
EEE 515.2	Final Year Project	-	18	6
Total		**13**	**18**	**20**

Electives (3Credits each)

EEE 507.2	Solid State Electronics	3
EEE 508.2	Communication Systems	3
EEE 509.2	Introduction to VLSI Technology	3
EEE 510.2	Power Systems Engineering	3
EEE 511.2	High Voltage Engineering & Switch Gear	3
EEE 512.2	Advanced Electrical Machines & Drives	3

5.0 COURSE CONTENT

5.1 Faculty-wide Courses

5.1.1 General Studies Courses (GES)

GES 100.1: **Communication Skills in English (3 Credits)**

Study skills and methods including use of language and use of the library. Listening comprehension skills. Reading skills. Using grammar in reading and writing. Writing skills. Examination techniques.

GES 101.2: Computer Appreciation and Applications (2 Credits)

History of Computers. Generations and classification of computers. IPO model of a computer. Components of a computer system – hardware and software. Programming languages, organization of data. Data capture techniques. Introduction to computer networks. Software and its application. Use of keyboard as an input device. DOS, Windows, word processing, spreadsheets. Application of computers in Medicine, Social Sciences, Humanities, Education and Management Sciences.

GES 102.1: Introduction to Logic and Philosophy (2 Credits)

The nature, definition and branches of Philosophy. Philosophy and other disciplines. Nature of philosophical problems. Periods in the history of Philosophy. Philosophy and national development. Types of argument and reasoning. Inferences.

GES 103.2: Nigerian Peoples and Culture (2 Credits)

The concept of culture. Pre-colonial cultures and languages of Nigeria. Principles of kinship, descent and marriage in Nigeria cultures. Nigerian economic institutions. Nigerian political institutions. Education and development in Nigeria. Religion in Nigerian culture. Culture, environment and health practices in Nigeria.

5.1.2 Science Courses (CHM,MTH, PHY)

CHEMISTRY (CHM)

CHM 130:1: General Chemistry 1 (3 credits)

Basic principles of matter and energy from the chemist's point of view. A broadly based course suitable from students from various schools as well as those from the faculty of science. Topics to be covered will include atomic theory and molecular structure stoichiometry, the periodic classification of the elements, atomic structure, chemical bonding properties of gases, solids, liquids and solutions, chemical equilibrium, ionic equilibria, chemical thermodynamics, electro-chemistry and chemical kinetics. (includes laboratory sessions.)

CHM 131.2: General Chemistry II (3 credits)

Application of the principles of chemical and physical change to the study of the behaviour of matter and the interaction between matter. Course content includes, the chemistry of representative elements and their common compounds with emphasis on gradation of their properties-

brief chemistry of the first series of transition elements, general principles of extraction of metals; introductory to nuclear chemistry. (includes Lab Session.)

CHM 240.2: **Physical Chemistry (3 Credits)**

Introduction to basic physical chemistry. The emphasis is on the properties of gases, the three laws of thermodynamics and the principles of chemical kinetics and electrochemical cells.

PHYSICS (PHY)

PHY 101.1: Mechanics and Properties of Matter (3 Credits)

Topics covered in this course will include the following: motion in one dimension, motion in a plane, work and energy, conservation laws, collisions, solid friction, rotational kinematics and rotational dynamics, equilibrium of rigid bodies oscillations, gravitation, fluid statics and fluid dynamics. Surface tension, elasticity and viscosity. Pre-requisite: WAEC credit in Physics,

PHY 102: 1: Physics Laboratory Practice (1 Credit.)

Laboratory exercises drawn from PHY 101.1

PHY 112.2: Electricity and Magnetism (3 Credits)

This is an introductory course on electricity and magnetism. Topics covered will include the electric field. Gauss law. Electric potential, capacitors and dielectric, current and resistance, electromotive force and circuits, the magnetic field, Ampere's law, Faraday's law of induction.

PHY 103.2: Physics Laboratory II (1 Credit)

The experiments carried out in this course will cover areas discussed in PHY 112.2. These experiments include verification of the laws of electricity, .measurement of the electrical properties of conductors; D.C. and A.C. circuit properties, series and parallel resonant circuits; transformer characteristics; and other electrical circuit problems.

PHY 216. 1: **Vibration, Waves and Optics (3Credits)**

This course is an introduction to oscillations and waves phenomena. Topics covered will include vibrations and waves, types of waves, sound waves and wave optics.

MATHEMATICS/COMPUTER SCIENCE (MTH)

MTH 110.1: Algebra and Trigonometry (3 credits)

Elementary notions of sets, subsets, union, intersection, complements; Venn Diagrams. Real numbers, integers. Rationals and Irrationals, Mapping of a set. Real Functions and their compositions. Quadratic Functions. Cubic Function. Roots of quadratic and cubic functions. Partial Fractions. Equations with complex roots. Complex number, Geometric representation of complex numbers, De Moirvers, series and sequences. Principles of mathematical induction. Binomial theorem. Trigonometric functions of angles. Circular functions. Addition theorems. Double and half angles.

MTH 120:1: Calculus (3 Credits)

Function of a real variable, graphs, limits and idea of continuity. The derivative as limit of rate of change. Technique of differentiation: Methods of change. Technique of differentiation: Methods of integration. Definite integrals. Application to areas, volumes.

MTH 124.2: Coordinate Geometry (3 Credits)

Straight lines, circles, parabola, ellipse, hyperbola. Tangents, normal. Addition of Vectors. Scalar and vector products. Vector equation of a line and plane. Kinematics of a particle. Components of velocity and acceleration of a particle moving in a plane. Force, momentum, laws of motion, under gravity, projectiles, resisted particle motion, elastic, string, simple pendulum impulse. Impact of two smooth sphere, and a sphere on a smooth sphere. Addition of Vectors.

5.1.3 Engineering Science Courses (ENG)

ENG 101.1: Engineering Drawing I (2 Credits)

Introduction to drawing instruments, scales, draughting aids and their proper use. Size of paper and drawing layout. Dimensioning, line work and lettering. Geometrical constructions and Engineering graphics. Development of geometrical figures and intersection of solids and curves. Introduction to projections.

ENG 102.2: Engineering Drawing II (2 Credits)

Orthographic projections in first and third angles. Isometric Projection; sections and sectioning, auxiliary views and staggered sectioning. Freehand sketching. Conventional practices with Simple examples, including threads and threaded fasteners, cam profiles and Assembly drawing from detailed components. Pre-requisites ENG 101.1.

ENG 103.2: Engineer-in-Society (1 Credit)

History of Engineering and technology and the Philosophy of Science. Development of the Engineering industry up to the present day. Safety and health at work. The role of engineers in Nation Building. Food production, housing, transportation, employment opportunities, energy supply, communication and social infrastructure, etc. The choice of Engineering solutions and decision-making process, risk analysis, etc. Lectures by invited professionals.

ENG 104.2: Manufacturing Technology/Workshop Practice (2 Credits)

Manufacturing methods with metal materials (cold and hot workings) such as deep drawing; wire drawing; spinning and rolling; extrusion. Machine-tool manufacture (turning, milling and shaping, etc), Fabrication by welding and threaded fasteners and riveting, etc, metal-casting; Manufacture of plastic products (moulding and blowing). Use of hand-tools, bench work and measuring instruments.

Fitting and joining processes (soldering, brazing) wood-working and machinery. Surface finishes, forging, etc

ENG 201.1: Engineering Mathematics I (Mathematical Analysis (3 Credits)

Functions of several variables: functions pf 2, 3 or more variables, partial derivatives, differentials, total differentials, application to approximate computations, Higher-order partial derivatives and differentials. Differentiation of composite, and implicit functions of several variables. Extrema and conditional extremum. Change of variables. Multiple integrals: Double and triple integrals, analysis in Cartesian coordinates, change of variables to polar, cylindrical, and spherical coordinates, curvilinear coordinates, application to problems of mechanics. Integral dependent on parameters, improper integrals, line integrals, Green's formula, conditions for independence of line integral on path, application of problems of mechanics and thermodynamics. Surface integrals , fluid flux across a surface, properties, Stroke's formula. Field theory, vector field and vector lines. Applied series: Expansion of power series, applications of Taylor's series, Fourier series orthogonal systems of functions, the Parseval's relation. Hilbert space, orthogonality with weight function, Fourier integral, Fourier transformation, applications. Special Functions, Gamma, Beta, Error, Bessel, Legendre and hypergeometric functions. Introduction to analytic

functions, Cauchy-Riemann equations, conformal mappings. **Pre-requisite: MTH 120.1**

ENG 202.1: Engineering Mathematics II(Linear Algebra and Analytic Geometry) (2 Credits)

Surfaces and curves in space, cylinders, cones, and surfaces of revolution. First and second-order algebraic surfaces, ellipsoids, hyperboloids and paraboloids. Systems of linear equations: Determinants, minors and cofactors, evaluation methods. Vector space, linear spaces, Euclidean space, orthogonality, change of basis, inverse matrix, eigenvectors and eigenvalues of a matrix, rank. Linear mappings, symmetric, bilinear and quadratic forms. Differentiation and integration of matrices. Applications of matrix algebra **Pre-requisite MTH 110.1 and 124.2**.

ENG 203.1: Engineering Mechanics (Statics and Dynamics) (3 Credits)

Basic concepts and principles of mechanics, equilibrium of particles in 2- and 3 – dimensions, moment and couple , system of forces, equilibrium of rigid bodies, friction – wedges, screw, wheel bolts and statically determinate structure - beams, trusses, frames and machines. Linear and curvilinear motions, acceleration, Kinetics of parties, Newton's Second law, impulse , momentum, impact and restitution, work, energy, power and efficiency. **Pre-requisite: PHY 101.1 and MTH 120.1**.

ENG 204.1: Basic Engineering Materials (2 Credits)

Atomic and crystal structure, Crystal imperfections and impurities in solids. Fundamentals of crystallography. Atomic vibrations and diffusion. Mechanical properties – Engineering and true stress – strain curves, ultimate strength, ductility, impact strength, hardness. Electrical properties- conductivity, semi-conductivity and super-conductivity. Optical and magnetic properties of materials. Simple phase diagrams of alloys, with emphasis on the iron-iron carbide system. The relationship between structure and properties. Creep, fatigue. Heat treatment processes. Stability of materials in the services environment – corrosive media, sub-zero and elevated temperatures, irradiation. Basic criteria for the selection of materials for Engineering applications. Engineering properties of wood, concrete, ceramics, polymers, and non-ferrous metals and allovs. **Pre-requisite: CHM 131.2 and MATH 124.2**.

ENG 205.2: Engineering Laboratory I (3 Credits)

Assigned laboratory exercises to reflect the basic Engineering courses in Applied Mechanics, Materials Science, Fluid Mechanics, Strength of materials. Thermodynamics and Heat transfer. Guidance on specific experiments and calculations will be provided by the various Lecturers.

ENG 206.2: Engineering Mathematics III (Differential Equations) (3 Credits)

Ordinary differential equations; First-order equations, examples of Engineering models, equations with variables separable, Bernoulli's equation; exact equations; the envelops of a family of curves, singular solutions, Clairaut's and Lagrange's equations, orthogonal and isogonal trajectories. Second-and higher-order equations and systems of equations, transformation of higher-order equations to system of first-order equations, first integrals. Linear equations, general theory, boundary value problems. Euler's equations, geometrical and physical interpretation of solutions. Operators and the operator method of solving equations, system of linear equations. Operational calculus, Laplace transform, theory and application to initial-value problems. Introduction to partial differential equations elliptic, hyperbolic and parabolic equations. **Pre-requisite: MTH120.1 and 124.2**

ENG 207.2: Basic Fluid Mechanics (2 Credits)

Fluid properties, fluid statics, principles of fluid flow and applications, flow measurements. Real fluid flow, curvilinear flow (2-dimensional). Dimensional analysis and similitude. Pipe flow and friction factors. Boundary layers and drag **Pre-requisite: PHY101.1 and ENG 205.1**

ENG 208.2: Basic Strength of Materials (2 Credits)

Force equilibrium – free body diagrams, centroids and second moment of area. Concept of stress and strain;

stress-strain diagram. Axially loaded members, composite bars; temperature stresses; relation between elastic constants. Thin cylindrical spherical and conical pressure vessels, cylindrical shells with rings, torsion of circular shafts and power transmission of shafts. Axial force, shear force and bending moment diagrams. Pure bending of beams, bending stresses in composite beams, shearing stresses in beams, complex stresses; principal stresses. **Pre-requisite: ENG 205.1**.

ENG 209.2: Basic Thermodynamics and Heat Transfer (3 Credits)

Engineering Thermodynamics: Basic concepts definitions, thermodynamic properties; the thermodynamic system units; equations of state for perfect and real gases, and gas mixtures, thermodynamics work and heat; the First law of thermodynamics, energy equations and analysis; basic thermodynamic processes and cycles for ideal gas, pure substance and mixtures; reactive systems; thermodynamic relations; the Second law of thermodynamics and introduction to irreversible processes. Heat Transfer Basic concepts, heat transfer modes and rate processes. Fourier's law of heat conduction; Newton's law of cooling; Stephan-Boltzmann law of thermal radiation and configuration factor algebra; stationary heat conduction in simple geometries and composite bodies; correlational equations for convective heat transfer, boiling and condensation; heat transfer by combined modes; insulation and intensification of heat transfer; electrical and triple

analogies; introduction to heat exchangers. **Pre-requisite: PHY 101.1**

ENG 210.1: Basic Electrical Engineering (3 Credits)

Circuit elements (R, L, C,) DC and AC circuits and signals Electrostatics and Electromagnetism, Basic circuit laws and theorems. Three phase circuits, power and power factor. Electrical and electronic measurements and measuring instruments. Introduction to machines. Introduction to Electronics; Semi-conductors. **Pre-requisite; PHY 101.1**

ENG 211.2: Engineering Laboratory II (1 Credit)

Assigned laboratory exercises to reflect the basic Engineering course in Electrical/Electronics. Guidance on specific experiments and calculations will be provided by the Lecturer.

ENG 212.2: Community Service (1 Credit)

Civil works beneficial to the University community and its environs including but not limited to farming, road building and maintenance, landscaping, planting of flowers and hedges, grass-cutting and general cleaning of campus and its environs, concreting and laying of seating and footpath slabs.

ENG 213.1 Computer Programming for Engineers (2 Credits)

Computers, Computing and Engineering, Algorithms, flour chart and pseudocode. Debugging techniques. Computer code security. Laboratory: Hands-on experience

on computers through the use of Compilers to run programs' and to solve simple analysis problems in fluid, the thermodynamics, heat transfer and electrical systems. **Pre-requisite: GES 101.2**.

GES 300.3 Fundamentals of Entrepreneurship (2 Credits)

Control of, history and the development of entrepreneurship, the entrepreneurship qualities and Characteristics, the opportunities; Starting and developing new business ventures, legal ownership; feasibility Studies; role of small and medium scale enterprise (SME) in the economy, role of government in entrepreneurship, business location and layout, accounting for SME, financing SME, managing of factors of SME, Marketing in SME, risk management of SME, Success and failure factors of SME prospects and challenges of entrepreneurship; ethical behaviour in small business.

ENG 300.3: Industrial Training I (0 Credit)

The practical exposure of the student through direct participation in the work of an industry, to real life working condition. During the training, the student acquires a familiarity with Engineering works, organization. Physical layout, and the flow of information, materials and operations. This information is expected to complement and integrate the student's classroom instruction and laboratory/workshop exercises. Duration: 3 months.

ENG 301.1: Engineering Mathematics IV (Probability and Statistics) (3 Credit)

Theory of probability: Motivation, probability models, probability axioms, combinatorial problems. Conditional probability, independence of events, Bernoulli trials. Discrete and continuous random variables, mass, distribution, and generating functions, random vectors, independent random variables, exponential distribution, reliability, failure density, hazard function, some important distributions, functions of two random variables, transform methods, computation of mean time to failure, inequalities and limit theorems. Conditional distribution and expectation, Stochastic process, Bernoulli, Poission, and Renewal processes, availability analysis, random incidence. Introduction to discrete and continuous Markov chains. Measures of central tendency. Statistical inference, parameter estimation, Hypothesis testing. Regression, correlation and analysis of variance. Elements of experimental design. **Pre-requisite: ENG 201.1**

ENG 302.1: Technical Writing and Presentation (2 Credits)

Data gathering and presentation. Technical correspondence: letters of inquiry and replies, letters of application and memoranda. Illustrating technical writing using tables, graphs, diagrams, equations and appendices. Report writing: progress reports, proposals, students project, thesis and dissertations. Oral and visual presentation. Computer-aided technical writing and

presentation; word processing and word-processing software packages.

ENG 303.2: Engineering Mathematics V(Numerical Methods and Computer Applications) (3 Credits)

Review of the number systems and error analysis. Numerical schemes, error analysis, computer algorithms and programs for the solution of the following problems: interpolation by polynomial; nonlinear equations; systems of linear equations, determinants and matrix eigenvalue problem; approximations; data fitting, orthogonal polynomials, least-squares, splines and fast Fourier transforms; differentiation and integration; difference equations; differential equations by Runge-kutta and other methods; boundary-value problems in ODE. Introduction to the finite-difference method for partial differential equations. **Pre-requisite ENG 202.1 and ENG 206.1**

GES 400.2 Entrepreneurship Project (2 Credits)

The Students are given project topic to write on.**Pre-requisition: GES 300.2**.

ENG 400.2: Industrial Training II (9 Credit)

The practical exposure of the student through direct participation in the work of an industry, to real life working condition. During the training, the student acquires a familiarity with Engineering works, organization, physical layout, and the flow of information, materials and operations. This information is expected to complement and integrate the student's classroom

instruction and laboratory/workshop exercises. Duration: 6 months.

ENG 401.1: Engineering Mathematics VI(Mathematical Modelling and Operations Research) (3 Credits)

Basic concepts, methodology, structures, information support and systems approach. Synthesis, analysis, validation and computer simulation of mathematical models. Mathematical modelling of Engineering design objects at micro-, macro- and meta-levels; synthesis, analysis and optimization of design objects. Models for Engineering decision making in design and operations, including environmental, social and economic considerations. Optimization of design and operations: unconstrained and constrained problems, sensitivity analysis; linear, integer, goal, geometric, dynamic, nonlinear and stochastic mathematical programming. Allocation, routing, searching, project scheduling, sequencing, replacement, inventory, gaming and queuing problems. Computer-aided mathematical modelling of Engineering design and operations. Application software packages. **Pre-requisite: ENG 206.2, 301.1 and 303.2.**

ENG 402.1: Engineering Economics (2 Credits)

Scope of Engineering investment decisions; compounding, discounting, and economic equivalence; cash flow analysis and inflation. Choosing between alternatives: methods for evaluating investments; depreciation, taxes, and cost of capital; comparing alternative investments; replacement analysis, budget and budget control, evaluation of public

projects. Decisions and cost analysis; lease-or-buy decisions; economic feasibility study of Engineering projects. Computer-aided Engineering economics. **Pre-requisite: ENG 301.1**

ENG 501.1: Professional Practice and Procedure (2 Credits)

Registration of engineers, duties and code of conduct and practice. Ethics, professional responsibilities and practice of Engineering in Nigeria. Typical problems and solutions in various areas of Engineering. Engineering projects, planning, feasibility studies and their relevance, guide-predesign survey and stages of Engineering design project scheduling Law: sources and branches of Nigeria Law, courts and tribunals. Law of contracts, the engineer as an expert witness. Industrial legislation concerned with incapacity or injury, working conditions, wages, redundancy, Trade Unions, structure, right and liabilities. Industrial disputes, safety and environmental protection. **Pre-requisite: ENG 103.2**.

ENG 502.1: Engineering Management (2 Credits)

Organizational structure, goals and functions. Project planning and control. Cost Engineering; capital and operation cost estimating, contingencies and allowances. Production forecasts. Phases and constraints, decline functions. Productivity improvement Purchasing and materials management. Maintenance management. Contract management. **Pre-requisite: Good academic standing**.

5.2 Electrical/Electronic Engineering Courses (EEE)

EEE 222.2 Electrical Engineering Drawing and Installation (2 Credits)

Design of simple domestic and industrial Installations. Design of simple alarm circuits. Safety and wiring regulation. Drafting equipment, instruments, symbols and notations. Electrical layouts and connection diagrams. Production of "as built drawings," wiring of discharge lamp fittings and energy meters. Earthing Techniques. Simple tests on installation and circuits. **Pre-requisite: ENG 210.2**

EEE 301.1: Electrical Engineering Analysis (3 Credits)

Review of Engineering applications of Differential Equations. Partial Differential Equations: Laplace Transformation and other transform methods. Series solutions and special functions such as Bessel's functions. Fourier Series and Fourier Transformation. Difference equations, Z-Transform and its inverse Non-linear differential equations: phase plane analysis, stability and limit circles, describing function analysis. **Pre-requisite: ENG 206.2, ENG 201.1, ENG 202.1**.

EEE 302.1: Measurement and Instrumentation (3 Credits)

Measurement parameter-fundamental units, standard errors, accuracy and sensitivity. Basic Meter in DC measurements; Basic meter in AC measurements; rectifier voltmeter, electrodynamometer, wattmeter, instrument transformers; DC and AC bridges and their applications.

Electronic instruments for the measurement of voltage, current resistance and other circuit parameters. Electronic voltmeters; AC voltmeters using rectifiers, electronic multimeter, digital voltmeters; oscilloscope. Instruments for generating and analyzing waveforms; square-wave and pulse generator, single generators, function generators; electronic counters and their applications. Time base analogue and digital data acquisition systems. Tape recorders, D/A and A/D conversions, sample and hold circuits. **Pre-requisite: ENG 210.1**.

EEE 303.1 Electronic Circuits (3 Credits)

Review of single stage transistor amplifiers and operational amplifier circuits. Analysis and design of multistage amplifiers. Feedback, Broadband and Narrow band amplifiers, power amplifiers, voltage and current stabilizing circuits. Sinusoidal RC and LC and crystal oscillators, other communication circuits. Review of elementary digital concepts, switching properties of electronic devices. Switching and wave shaping circuits. Generation of non-sinusoidal waveforms: astable, monostable, and bistable multivibrators. Timer, clipping circuits and their applications.

EEE 304.1 Physical Electronics (3 Credits)

Free-electron motion in static electric and magnetic fields, electronic structure of matter, conductivity in crystalline. Theory of energy bands in conductors, insulators, and semi-conductors, electrons in metals and electron emissions, carriers and transport phenomena in semi-

conductors, characteristics of some electron and photo-devices, junction diodes and transistors FETS, SCT, Vacuum tubes, photo resistors, diodes, transistors, photo cell and light emitting diode. Elementary discrete devices fabrication techniques and IC technology.

EEE 305.1: Electrical/Electronic Engineering Laboratory I (3 Credits)

Electronic circuits: Diode circuits and applications. Transistor circuits: BJT circuits and applications; FET circuits and applications. Power Supply Circuits; Analysis and design, Waveform generation and regulations; Clipper Circuits and application. Basic Electrical Circuits; Demonstration and verification of Ohms Law and Kirchhoff's Laws; Power in DC circuits; dissipation on the resistive loads; A.C. voltmeter and current measurements; Use of instruments; Wattmeter in AC circuits.**Pre-requisite: Concurrent registration with EEE 303.1, EEE 304.1**.

EEE 306.2: Circuit Theory (3 Credits)

Phasors complex algebra and complex notation. Application of Laplace transformation to transient analysis of RLC circuits, transfer function concepts. Types of response; transient, and steady-state response. Frequency response. Foster and Cauer's methods of synthesis, 2-port network synthesis, 2-port network synthesis, active filters. Approximation to non-linear characteristic analysis and synthesis of non-linear resistive circuits, harmonic

analysis of non-linear dynamic circuits applications of computers in the analysis of non-linear circuits. **Pre-requisite: ENG 210.1**.

EEE 307.2 Electromagnetic Fields and Waves (3 Credits)

Maxwell's equation (in rectangular coordinates and vector-calculus notation); Derivation of Maxwell's equations, electromagnetic potential and waves, pointing vector, boundary conditions; waves propagation in good conductors skin effects; plane waves in unbounded di-electric media, fundamentals of transmission lines, waves-guides and antenna. **Pre-requisite: PHY 112.2, PHY 216.2**.

EEE 308.2: Digital Systems Fundamentals (3 Credits)

Boolean algebra and the nature of two-value variables. Boolean functions and reduction techniques. Logic gates. Combinational logic circuits. Analysis and design of logic gates of various families. Diode logic, RTL, TTL, ECL, MOS, and CMOS of digital integrated circuits. Interfacing between various logic families. Concepts of small, medium, large and very large scale integration and their consequences, some digital building blocks. Flip-flop counters, registers and decoders introduction to D/A and A/D conversion principles. **Pre-requisite: EEE 303.1, ENG 303.2**.

EEE 309.2 Signal Theory and Processing (3 Credits)

Signal classification; basic signals; review of Fourier series and transforms, Laplace transforms and Z-transforms; power and energy density spectra; auto- and cross-correlation; convolution; probability, random variables, and random processes; noise definitions, application of spectral transforms in low-pass, high-pass and band-pass filter synthesis; digital filtering. hardware and software filter realization; basic image processing concepts. **Pre-requisite: EEE 301.1, ENG 301.2**.

EEE 310.2 Electrical/Electronic Engineering Laboratory II (3 Credits)

Digital circuits: Number systems; Combinational logic circuits; Sequential logic circuits.

Control Systems and Power Electronics: Multistage Amplifier circuits; Signal generations; AM, FM modulation techniques. Measurement and Instrumentation: Application of Transducers in: temperature, pressure, fluid flow and strain gauges. **Pre-requisite: EEE 303.1, EEE 304.1, EEE 308.2**.

EEE 401.1: Control Systems (3 Credits)

Basic concepts and examples of control systems; mechanical, electrical, and pneumatic systems; method of systems; block diagram models, signal flow graph models; feedback control system characteristics – open and closed loop feedback control systems; concept of stability; frequency-response analysis, polar and bode stability

criteria; compensation techniques; introduction to non-linear systems.

EEE 402.1 Power Electronics (2 Credits)

Thyristor characteristics; ratings and protection; firing circuits; controlled rectifiers and commutation methods; inverters; A.C. voltage controllers; speed control of motors; chopper circuits; oscillators. **Pre-requisite: EEE 303.1, EEE 304.1**.

EEE 403.1: Communication Principles (2 Credits)

Amplitude modulation, double side band, single sideband, and vestigial sideband modulation schemes; power and bandwidth performance; angle modulation; frequency modulation; phase modulation; bandwidth requirements; clippers and limiters; amplitude modulated signal reception; discrimination, frequency tracking, phase-locked-loop and noise performance; sampling theorem; pulse amplitude modulation; pulse width modulation; multiplexing; quantization systems and pulse code modulation; Shannon's theorem; introduction to television. **Pre-requisite: EEE 309.2**.

EEE 404.1: Electrical Machine (3 Credits)

Review of electromechanical energy conversion, rotating magnetic fields; performance and methods of speed control of DC machines; induction motors, linear induction motors, circuits diagram; power transformers, and parallel operation of 3-phase transformers; performance of synchronous generators, fractional horse-

power motors, single-phase induction motors, universal motors; reluctance motors; hysteresis motors; faults on machine; methods of starting and protection of machines. **Pre-requisite: ENG 210.1**.

EEE 405.1: Electrical Power Principles (3 Credits)

Introduction to power systems; conventional and renewable sources of electric energy; structure of electric systems; load characteristics; electric energy transmission and distribution; line impedance, representation and per-unit systems; relationship between currents and voltages; regulation of voltage, transmitted power and losses; construction of overhead limes and underground cables; power system equipment; standards and safety. **Pre-requisite: ENG 210.1**.

EEE 406.1 Electrical/Electronic Engineering Laboratory III (3 Credits)

Power Systems: transformers; connection and transmission line parameters.

Machines: motors-various types and their applications; SCR speed control of DC machines.

Microprocessor-based systems (Computers): Application of adders; registers and memory devices; counters, multiplex decoders; Basic computer units; converters (ADC and DAC); design of simple microprocessor-based systems; assembly and maintenance of personal computers. **Pre-requisite: EEE 402.1, EEE 404.1, EEE 308.2**.

EEE 501.1: Control Engineering (3 Credits)

State-space description of linear systems; concepts of controllability and observability; state feedback model control observers; realization of systems having specified transfer function; application to circuit synthesis and signal processing. **Pre-requisite: EEE 401.1**.

EEE 502.1 Computer Applications and Data Management (3 Credits)

Computer Applications: Introduction to C++ and Matlab programming.

Data Management: Trends in Computer management, user-group interactions and operations; office procedures; organization structures; basic structures for data representations; data capture, data analysis, data security, data management; concepts underlying file organizations and management; file manipulations and maintenance; database organization; memory management; risk management and planning; system analysis techniques. **Pre-requisite: ENG 213.1**.

EEE 503.1 Telecommunication Engineering (2 Credits)

Digital Communication: Numbering systems; Basic information Theory.

Data Communication: Networking and Networks (LAN, MAN, and WAN), Interfaces; Protocols, and standards in data communication; Elements of 3G networks. **Pre-requisite: EEE 403.1, EEE 308.2**.

EEE 504.1: Reliability and Maintainability of Components and Systems(2 Credits)

Introduction to reliability, maintainability; elementary reliability theory; application to power systems and electronic components; test characteristics of electrical and electronic components; types of faults; designing for higher reliability; packaging, mounting, ventilation, protection from humidity, dust. **Pre-requisite EEE 402.1, EEE 404.1**.

EEE 505.1 Industrial Electronic Design (2 Credits)

Oscillators, diodes and their applications; power supply designs; transducers and their applications in sensing light, voltage pressure, motion, current temperature, etc; mechanical relays, solid state relays, and stepping motors; real-time control and remote-control concepts in instrumentation; microprocessor and micro-computer based systems. **Pre-requisite: EEE 303.1, EEE 304.1**.

EEE 506.1:Technical Seminar (1 Credit)

This course is designed to allow project, research and industrial topics to be discussed by both staff and students. In the process, the students learn how to present ideas and technical reports. **Pre-requisite: ENG 302.1**.

EEE 507.2 Solid State Electronics (3Credits)

Physics and properties of semi-conductors including high field effects, carrier injection and semi-conductor surface optimal material growth and impurity control; metal-semi-conductor interface properties; stability and methods of

characterization; controlled and surface-controlled devices. **Pre-requisite: EEE 303.1, EEE 304.1**.

EEE 508.2 Communication Systems (3 Credits)

Satellite Communication: Kepler's laws; orbits; power systems; altitude control; satellite station keeping; limits of visibility; frequency plans and polarization; transponders; satellite–Earth link; multiple access methods, satellite link budget; INTELSAT VI. Regional satellite communication systems; transmission lines; wave-guides and microwave components.

Antennas: Antenna equivalent circuits; coordinate systems; radiation fields; polarization; isotropic radiators; power gain; effective dimensions; Hertzian dipole; half-wave dipole; vertical antenna; folded elements; loop and ferrite-rod receiving antenna; driven arrays; parasitic arrays; VHF-UHF antennas; microwave antennas. Radiowave propagation: propagation in free space, tropospheric propagation; ionospheric propagation; surface waves; low frequency propagation and very low frequency propagation.

Fiber-Optic Communication: principles of light transmission in fiber losses in fiber; dispersion; light sources for fiber optic; photo detectors; connectors; and spies; fiber optic communication; layout techniques. **Pre-requisite: EEE 309.2, EEE 403.1**.

EEE 509.2 Introduction to VLSI Technology (3 Credits)

Principles of large scale NMOS design; stick diagrams; NMOS transistors; switch and gate logic programmable logic arrays; 2-phase dynamic design; finite-state machines; scalable design rules; speed and power considerations; floor planning and communication; layout technique. **Pre-requisite: EEE 303.1, EEE 304.1 and EEE 308.2**.

EEE510.2: Power Systems Engineering (3 Credits)

Representation of power systems; power system equation and analysis; load flow studies; load forecasting; economic operation of power systems; symmetrical components; symmetrical and unsymmetrical faults; detection, discrimination and fault clearance.

EEE511.2: High Voltage Engineering and Switchgear (3 Credits)

Generation and measurement of high voltage and current; high-voltage tests and measuring devices; breakdown theories for gaseous, liquid and solid dielectric; impulse protection of substation; lightning phenomena and protection; traveling waves in transmission lines; electric cables and condensers.

EEE 512.2 Advanced Electrical Machines and Drives (3 Credits)

Review of fundamental laws, including Maxwell's equations; coupling concepts; voltage equations and equivalent circuits of induction and synchronous machines

symmetrical and unsymmetrical windings; distribution of field and current loading; production of constant and pulsating torques harmonic torques; introduction of generalized electrical machine theory, basic concepts of electric drives; electrical characteristics of drives; speed control, motor selection and load diagrams. **Pre-requisite: EEE 404.1**.

EEE 513.2 Electrical Services Design (2 Credits)

Lighting installation; power installation; energy supply and distribution; choice of cables and conductors; wiring systems and accessories for outdoor low voltage installation; characteristics of low-voltage equipment; earthing and testing of electrical installation; illumination, IEEE regulations. **Pre-requisite: EEE 222.2, EEE 306.2**.

EEE 514.2 Computer Architecture and Organisation (3 Credits)

Elements of digital computer design: control unit, micro-programming, bus organization and addressing schemes; micro-processors, system architecture; instruction execution and addressing modes; machine codes, assembly language programming, micro-processors and state machine.

Micro-processor interfacing: input/output technique; interrupt system and direct memory access; interfacing to analogue system and applications to D/A and A/D converters.

System development: tools and simulators; EPROM programming; assemblers and loaders; overview of typical micro-processor and micro-computer systems; operating systems and computers; micro-processor applications. **Pre-requisite: EEE 308.2**.

EEE 515.2 Final Year Project (6 Credits)

Final year students must carry out individual projects. The topics may be chosen from a list compiled by the staff of the Department. Students may however, carry out a project in a relevant area of their choice in consultation with their project advisers. A written report on the project is submitted at the end. This forms the basis for an oral examination or project defence before a Board of Examiners. **Pre-requisite: Good Academic Standing**.

APPENDIX

STUDENT'S ACADEMIC RECORDS

Mark	Grade Point	Letter
70% and above	**5.0**	**A**
60% - 59%	**4.0**	**B**
50% - 49%	**3.0**	**C**
45% - 49%	**2.0**	**D**
40% - 44%	**1.0**	**E**
0% - 39%	**0.0**	**F**

YEAR ONE

Name of Student:
Mat. No.:

Academic Session……. Year One 1ST Semester

Course Code	Course Title	Credit unit	Mark	Grade	Quality Point
GES. 100.1	Communication Skills in English	3			
GES. 102.1	Introduction to Logic & Philosophy	2			
CHM.130.1	General Chemistry I	3			
PHY. 101.1	Mechanics & Properties of Matter	3			
PHY. 102.1	Physics Laboratory I	1			
MTH. 110.1	Algebra & Trigonometry	3			
MTH. 120.1	Calculus	3			
ENG. 101.1	Engineering Drawing I	2			
	TOTAL	20			

Year One 2nd Semester

Course Code	Course Title	Credit units	Mark	Grade	Quality Point
GES 101.2	Computer Appreciation and Application	2			
GES. 103.2	Nigerian Peoples of Culture	2			
CHM.131.2	General Chemistry II	3			
PHY. 112.2	Electricity & Magnetism	3			
PHY. 103.2	Physics Laboratory II	1			
MTH. 124.2	Coordinate Geometry	3			
ENG. 102.2	Engineering Drawing II	2			
ENG. 103.2	Engineer-In-Society	1			
ENG. 104.2	Manufacturing Tech./Workshop Practice	2			
	TOTAL	19			

TCU= **TQP=** **GPA=**

YEAR TWO

Name of Student:
Mat. No.:

Academic Session……Year Two1st Semester

Course Code	Course Title	Credit units	Mark	Grade	Quality Point
PHY. 216.1	Vibration Waves and Optics	3			
ENG. 201.1	Engineering Mathematics I	3			
ENG. 202.1	Engineering Mathematics II	2			
ENG. 203.1	Engineering Mechanics	3			
ENG. 204.1	Basic Engineering Materials	2			
ENG 213.1	Computer Programme for Engineers	2			
ENG 213.2	Basic Electrical Engineering	3			
	TOTAL	18			

Year Two 2nd Semester

Course Code	Course Title	Credit	Mark	Grade	Quality point
CHM.240.2	Physical Chemistry	3			
ENG 205.2	Engineering Laboratory I	3			
ENG. 206.2	Engrg. Maths III (Differential Equations)	3			
ENG. 207.2	Basic Fluid Mechanics	2			
ENG. 208.2	Basic Strength of Materials	2			
ENG. 209.2	Basic Thermodynamics & Heat Transfer	3			
ENG. 211.2	Engineering Laboratory II	1			
ENG. 222.2	Electrical Engrg. Drawing/Installation	2			
ENG. 212.2	Community Service	1			
	TOTAL	20			

TCU= **TQP=** **GPA=**

YEAR THREE

Name of Student:
Mat. No.:

Academic Session……. Year Three 1st Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
ENG. 301.1	Engineering Mathematics IV	3			
ENG. 302.1	Technical Writing and Presentation	2			
EEE. 301.1	Electrical Engineering Analysis	3			
EEE. 302.1	Measurement and Instrumentation	3			
EEE. 303.1	Electronic Circuits	3			
EEE. 304.1	Physical Electronics	3			
EEE. 305.1	Electrical/Electronic Engineering Lab. I	3			
	TOTAL	20			

Year Three 2nd Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
GES 300.2	Fundamental of Entrepreneurship	1			
ENG 303.2.	Engineering Mathematics V	3			
EEE. 306.2	Circuit theory	3			
EEE. 307.2	Electromagnetic Fields and Waves	3			
EEE. 308.2	Digital Systems Fundamentals	3			
EEE. 309.2	Signal Theory & Processing	3			
EEE. 310.2	Electrical/Electronic Engineering Lab. II	3			
	TOTAL	20			

TCU= TQP= GPA=

YEAR FOUR

Name of Student:
Mat. No.:

Academic Year……..Year Four 1st Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
ENG. 401.1	Engineering Mathematics VI	3			
ENG. 402.1	Engineering Economics	2			
EEE 401.1	Control Systems	3			
EEE. 402.1	Power Electronics	2			
EEE. 403.1	Communication Principles	2			
EEE. 404.1	Electrical Machines	3			
EEE. 405.1	Electrical Power Principles	3			
EEE. 406.1	Electrical Electronic Engineering Lab. III	3			
	TOTAL	21			

Year Four 2nd Semester

Course Code	Course Title	Credit Units	Mark	Grade	Quality Point
ENG.. 400.2	Industrial Training	9			
GES 400.2	Entrepreneurship Project	2			
	TOTAL	11			

TCU= **TQP =** **GPA =**

YEAR FIVE

Name of Student:
Mat. No.:

Academic Year…….. **Year Five 1st Semester**

Course Code	Course Title	Credit Unit	Mark	Grade Point	Quality Point
ENG. 501.1	Professional Practice and Procedure	2			
ENG. 502.1	Engineering Management	2			
EEE. 501.1	Control Engineering	3			
EEE. 502.1	Computer Application & Data Management	3			
EEE. 503.1	Telecommunication Engineering	3			
EEE. 504.1	Reliability of Components and Systems	2			
EEE. 505.1	Industrial Electronic Design	2			
EEE. 506.1	Technical Seminar	1			
	TOTAL	18			

Year Five 2nd Semester

Course Code	Course Title	Credit Units	Mark	Grade point	Quality Point
EEE 507.2	Solid State Electronics	3			
EEE. 508.2	Communication System	3			
EEE. 509.2	Introduction to VLSI Techn.	3			
EEE 510.2	Power Systems Engineering	3			
EEE 511.2	High Voltage & Switchgear	3			
EEE. 512.2	Advanced Electrical machine and Drives	3			
EEE. 513.2	Electrical Service Design	2			
EEE. 514.2	Computer Architecture and Organization	3			
EEE. 515.2	Final Year Project	6			
	TOTAL	23			

TCU= TQP= GPA= FINAL CGPA =

Class of Degree ……

YEAR SIX (FIRST EXTRA YEAR)

Name of Student:
Mat. No.:

Academic Year…….. **Year Six 1st Semester**

Course Code	Course Title	Credit Unit	Mark	Grade Point	Quality Point
	TOTAL				

Year Six 2nd Semester

Course Code	Course Title	CreditUnits	Mark	Grade point	Quality Point
	TOTAL				

TCU= TQP= GPA= FINAL CGPA =

YEAR SEVEN (SECOND EXTRA YEAR)

Name of Student:
Mat. No.:

Academic Year…….. **Year Seven 1st Semester**

Course Code	Course Title	Credit Unit	Mark	GradePoint	Quality Point
	TOTAL				

Year Seven 2nd Semester

Course Code	Course Title	CreditUnits	Mark	Grade point	Quality Point
	TOTAL				

TCU= TQP= GPA= FINAL CGPA =

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