Preamble

The Departmental handbook is to provide information to prospective students and registered students on programme of studies offered by the Department of Electrical and Electronic Engineering, Ekiti State University, Ado Ekiti. It is hoped that the information would assist students to derive maximum advantages from the opportunities and facilities available in the Faculty and the University in planning their academic programmes.

The Department offers courses and programmes of study leading to the award of the degree of Bachelor of Engineering at the undergraduate level. Our graduates should not find it difficult to secure employment in Nigeria Industries, where it is envisaged that shortage of engineering talents would prevail from time to time.

The currently available five-year engineering degree programmes are built on a common foundation of basic studies comprising mathematics, basic sciences, engineering sciences and general studies. The programmes are designed to facilitate specialization, while allowing opportunities for taking approved courses from other areas. The programmes are also fashioned to allow the prospective engineer to have appropriate technical expertise and human perspective.

The Department of Electrical and Electronic Engineering issues this Handbook as a general guide to its courses and facilities. It forms no part of a contract. The Department reserves the rights to modify or alter without prior notice any of the contents herein.

PRINCIPAL OFFICERS OF THE UNIVERSITY 2020/2021 SESSION

VISITOR
HIS EXCELLENCY BIODUN ABAYOMI OYEBANJI
(The Executive Governor of Ekiti State)

PRO-CHANCELLOR AND CHAIRMAN OF COUNCIL
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B.Sc., M.Sc., Ph.D (Ado-Ekiti)

DEPUTY VICE-CHANCELLOR (DEVELOPMENT)
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B.A, M.A., Ph.D (Ado Ekiti)

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B.A (Hons.), MPA, M.Sc., FNIM, FCIA

BURSAR
MR. ABIMBOLA TITILOYE
B.Sc.(Lagos), MBA (Benin), FCA

LIBRARIAN
DR. F. FABUNMI
B.Sc., M.Sc., Ph.D.

PRINCIPAL OFFICERS OF THE FACULTY OF ENGINEERING
2020/2021 SESSION

DEAN, FACULTY OF ENGINEERING
PROFESSOR OLUWASEYI LANRE OKE
B.Sc.(Ife), M. Sc. (Ibadan), Ph.D. (Nottingham), R.Eng, MNSE

SUB-DEAN

ENGR. DR. B. ADEBANJI
B.Eng.(Ado-Ekiti), M. Eng., Ph.D (Ogbomosho), R.Eng, MNSE

ACTING HEAD OF DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
ENGR. DR. O. ADETAN
B.Eng. (Ado Ekiti), M. Eng. (Akure), Ph.D. (Durban, South Africa), R.Eng, MNSE, MIEEE

ACTING HEAD OF DEPARTMENT OF CIVIL ENGINEERING
ENGR. DR. O. P. FOLORUNSO
B.Eng.(Ado Ekiti), M. Eng. (Benin), Ph.D. (Birmingham), R.Eng, MNSE

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ENGR. DR. D.O. AKINDELE
B.Eng, M.Eng. (Ado-Ekiti), Ph.D. (Sheffield), R.Eng, MNSE

FACULTY OFFICER/DEPUTY REGISTRAR
Mrs. O. Omotoye

HEADSHIPS SINCE INCEPTION

S/N	NAME	PERIOD	DESIGNATION
1	Prof V.A Williams	1986-1987	Head
2	Dr L.A Balogun	1987-1988	Coordinator
3	Dr A. Esan	1988-1992	Ag. Head
4	Prof V.A Williams	1992-1994	Head
5	Prof S.I.A Ojo	1994-1995	Coordinator
6	Mr A.A Adegbemile	1995-1998	Coordinator
7	Dr A.C.T Briggs	1998-2001	Ag. Head
8	Mr O.O Fagbohun	2001-2004	Coordinator
9	Mr Adebgemile	2004-2006	Coordinator
10	Mr A.O Ajibulu	2006-2007	Coordinator
11	Prof. I.E Owolabi	2007-2011	Head
12	Engr. Atandare	2011-2012	Coordinator
13	Engr. A.A Adegbemile	2012-2013	Coordinator
14	Engr. V.S.A Adeoye	2013-2014	Ag. Head
15	Engr. Dr O.O Fagbohun	2014-2016	Ag. Head
16	Engr. Dr I.B Oluwafemi	2016-2018	Ag. Head
17	Engr. Dr P.K Olulope	2018-2019	Ag. Head
18	Engr.Dr (Mrs) J.O.Femi-Jemilohun	2019-2021	Ag. Head
19	Engr. Dr. O. Adetan	2021-date	Ag. Head

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
FACULTY OF ENGINEERING
EKITI STATE UNIVERSITY, ADO – EKITI, NIGERIA,
STAFF LIST 2020/2021 SESSION (ACADEMIC STAFF)

	Name of Staff	**Rank/Designation/salary Scale**	**F/T**	**Qualification, Dates obtained and Specialization, Membership of Professional Association and Number of Publications**	**Area of Specialization**	**E-mail Address and Phone Number**
1	Engr. Dr. O. Adetan	Reader /Ag. HOD UASS 6	F	B.Eng(Ado-Ekiti, M.Eng(Akure), Ph.D(Durban),MNSE, R.Eng	Electronic and Communication	oluwumi.adetan@eksu.edu.ng 08035618024
2	Engr. Prof. O.O.Fagbohun	Professor UASS 7	F	B.sc, M.Sc.(Ife), Ph.D. (Benin), MNSE,R.Eng (Electronics and Instrumentation)	Electronic and Instrumentation	olumuyiwa.fagbohun@eksu.edu.ng 08089817033
3	Engr. Dr. P.K Olulope	Reader UASS 6	F	B.Eng (Ado-Ekiti), M.Eng(Benin), Ph.D , (Cape Town),MNSE, R.Eng (Power and machine)	Power and Energy system	paul.olulope@eksu.edu.ng 09030895931
4	Engr. Dr. I.B. Oluwafemi	Reader UASS 6	F	B.Eng (Ado-Ekiti), M.Eng (Benin), Ph.D (Durban), MNSE, R. Eng,	Electronic and Communication	ilesanmi.oluwafemi@eksu.edu.ng 08033902349
5	Engr. Dr.(Mrs) O.J Femi-Jemilohun	Reader UASS 6	F	B.Eng(Ado Ekiti), M.Eng (Akure), PhD(Essex) MNSE, R.Eng	Electronic and Communication	oladunni.fenmijemilohun@eksu.edu.ng 08032664830
6	Engr. Dr A. Abe	Senior Lecturer UASS 5	F	B.Eng(Ado Ekiti), M.Eng (Benin), PhD(Essex) MNSE, R.Eng	Electronic and communication	adewale.abe@eksu.edu.ng 08121701535
7	Engr Dr. E.T. Fasina	Senior Lecturer UASS 5	F	B.Eng(Ado), M.Eng (Ogbomoso), Ph.D (Cardiff) MNSE, R.Eng	Power system and Machine	emmanuel.fasina@eksu.edu.ng 08035618035
8	Engr. Dr. B. Adebanji	Senior Lecturer UASS 5	F	B.Eng(Ado), M.Eng, Ph.D (Ogbomoso), MNSE, R.Eng	Power system and Machine	bankole.adebanji@eksu.edu.ng 08035605051
9	Engr. A.A. Adegbemile	Lecturer I UASS 4	A	B.Sc(Leicester), M.Sc (Ibadan), MNSE, R.Eng	Electronic and communication	adelekeadegbemile@yahoo.com 08034740050
10	Mr. C.E Okafor	Lecturer I UASS 4	F	B.Eng(Nssuka), M.Eng (Benin), MNSE	Power system and Machine	chuckwuemeka.okafor@eksu.edu.ng 0812
11	Mr, I.Ismail	Lecturer II UASS 3	F	B. Eng (Zaria), M.Eng (Ado Ekiti)	Electronic and Communication	isiaka.imail@eksu.edu.ng 07039481072

B. TECHNICAL STAFF

S/N	NAME	QUALIFICATIONS	STATUS	PHONE NUMBER
1	Engr B.O. Isijola	HND,PGD, M.Sc. R.Eng (COREN)	Senior Chief Technologist	08035134841
2	Engr.M.S. Obayanju	HND,PGD, M.Eng., R.Eng (COREN)	Senior Chief Technologist	08033978385
3	Mr. C.O Adamolekun	HND	Senior Technologist	08160231972
4	Engr. Mrs. G.F Ojo	HND	Technologist I	08054583644
5	Engr. J.A. Ajayi	HND	Technologist I	08033931940

C. NON TEACHING STAFF

S/N	NAME	QUALIFICATIONS	STATUS	
1	Mrs B. Lawal	SSCE/O-Level	Senior Clerical Officer	07068440484
2	Miss T. Adelusi	SSCE/O-Level	Office Assistant	08134146674

D. ACADEMIC STAFF TAKING COMMON SCIENCE, ESC AND GST COURSES

S/N	NAME	QUALIFICATIONS	STATUS	COURSE/DEPARTMENT
1	G.E. Adesakin	B.Sc., M.Sc., Ph.D	Senior Lecturer	Physics
2	E. A. Oyedele	B.Sc., M.Sc., Ph.D	Senior Lecturer	Physics
3	A.J. Adesina	B.Sc., M.Sc., Ph.D	Senior Lecturer	Chemistry
4	O.A. Ibigbami	B.Sc., M.Sc., Ph.D	Senior Lecturer	Chemistry
5	A.O. Ayodele	B.Sc., M.Sc., Ph.D	Lecturer II	Chemistry
6	S. FAdugba	B.Sc., M.Sc., Ph.D	Lecturer I	Mathematics
7	V.A. Ogbeide	B.A., M.A., Ph.D	Professor	GST
8	O. Owoeye	B.A., M.A., Ph.D	Professor	GST
9	A. Awe	B.Sc., M.Sc., Ph.D	Professor	ESC

FACULTY OF ENGINEERING PAST AND CURRENT DEANS/SUB DEANS

S/N	PERIOD	NAME	SUB-DEAN
1	1985 – 1986	Prof. B. D. Ako (Dean of Science oversaw new Faculty of Engineering)	-
2	1986 – 1987	Prof. V. A. Williams	-
3	1987 – 1988	Dr. L. A. Balogun	-
4	1988 – 1989	Dr. A. A. Esan	-
5	1989 - 1990	Dr. S. I. A. Ojo	-
6	1992 – 1996	Prof. S. I. A. Ojo	Dr. J. B. Adeyeri 92/93 Engr. S. B. Adeyemo 94/95 Engr. J. O. Aribisala 95/96
7	1996 – 1998	Prof J. B. Adeyeri	Engr S. B. Adeyemo
8	1998 – 2000	Dr. O. Ogunlade	Engr. I. O. Ogunleye
9	2000 – 2002	Dr. S. B. Adeyemo	Engr. A. T. Oyediran
10	2002 – 2004	Dr. J. O. Aribisala	Engr. A.A.A. Adegbemile
11	2004 – 2006	Dr. E. A. Okunade	Engr. Fagbohun
12	2006 – 2008	Dr. S. B. Adeyemo	Engr. S. O. Fatuase
13	2008 – 2009	Prof. J. O. Aribisala	Engr T. O. Oni
14	2009 – 2013	Prof. S. B. Adeyemo	Engr T. O. Oni
15	2013 – 2015	Prof E. A. Okunade	Dr I. B. Oluwafemi
16	2015- 2017	Prof E. A. Okunade	Dr. T. O. Oni
17	2017-2019	Dr. O.A.Oni	Engr. B.O.Ojedayo
18	2019-July 2021	Prof. I. O. Oluwaleye	Engr.Dr. S. Awopetu Engr. Dr. A. Abe Jan–Jul.2021
19	August 1st, 2021- date	Prof. O.L. Oke	Engr. Dr. B. Adebanji, Aug.1st 2021-date

SOURCES OF INFORMATION ON SERVICES TO STUDENTS

SERVICES	OFFICE/ LOCATIONS
Admission, Course Registration Registration and Matriculation	Academic Affairs Office Registry
Library Services	University Library, Main Campus
Record/Academic Transcripts and Examination	The Academic Affairs Office, Registry
Payment of Fees	Accountant (Students) Bursary Department
Postgraduates Studies	The Secretary, School of Postgraduate Studies, EKSU
Financial Aid, Loans, Bursaries, Awards, Scholarships and Prizes	The Students' Affairs Office Registry
Foreign Students' Matters	The Students' Affairs Office Registry
Health Services	Director Health Services,

	University Health Centre, Ado-Ekiti
Security	The Chief Security Officer
Guidance and Counselling/Career Matters	The Students' Affairs Office Registry
Passages and Immigration	Passages Officer c/o Bursar's Office, Main Campus
SERVICES	**OFFICE/ LOCATIONS**
NYSC Matters	The Students' Affairs Office Registry
Application for International Passport and Summer Flights	Through Students' Union, SUB
Clubs and Societies	Students' Affairs Office Registry
Accommodation in the Halls of Residence/Hostels	The Students' Affairs, Registry
Banks	1. The Manager, Wema Bank Plc EKSU Campus Branch 2. The Manager, Enterprise Bank Plc EKSU Campus Branch 3. The Manager, Intercontinental Bank Plc EKSU Campus Branch 4. The Manager, Oceanic Bank Plc EKSU Campus Branch 5. The Manager, Zenith Bank Plc EKSU Campus Branch
Postal Services	Ground Floor, Omolayo Administration Building
Fire Services	c/o Security Unit/Works and Services Department, Central Administration
Computer Services	The Director, Computer Centre, EKSU
University Publications, Protocols and Public Relations	Information/Public Relations Officer, Vice-Chancellor's Office.
Research and Development	Director, Centre for Research and Development, Ado-Ekiti
Information Unit	Vice-Chancellor's Office

LOCATION OF THE UNIVERSITY

Ekiti State University Ado-Ekiti is located at Ado-Ekiti, capital of Ekiti State. It is built on a piece of land ringed by the lofty Ado-Araromi-Iyin-Ika-Eyio-lworoko and Emirin ridges. The site presented by the ridges is gently sloping with an average height of about 500 meters above sea level. It has its highest point at the southern portion.

The ridges also present beautiful scenery and shelter if viewed from the University Library car park. These characteristics have probably constituted the main factor which led government to choose this particular site amidst the much diversified topography. The city of Ado-Ekiti and the town of Araromi, Iyin, Ika, Eyio and Iworoko constitute settlement rings around the University. The land on which the University is, is located by river Elemi and its tributaries.

The currently built up area of the University land has been designed the Mini Campus and was designed to meet the immediate physical development need of the University pending the time the Main Campus would be developed. The Mini Campus occupies only a very small part of the University land and present physical development will not affect the development of the Main Campus. A master plan of this Campus has been commissioned and work on it is at advanced stages.

SHORT HISTORY OF THE FACULTY
Philosophy of EKSU Engineering Programme

The Philosophy of the Faculty derives from the developmental philosophy of the University. As a developmental university, the institution sets itself the mission of identifying and helping to solve he developmental problems of the state through training, research and services. In furthering of this objective, the Faculty of Engineering provides innovative educational programmes of high standard to produce engineers for the industrialization of the nation. Unlike other conventional universities, EKSU's Programme in engineering encompasses a comprehensive course of lectures and practicals in industrial processes, management and finance. This is considered very relevant for the industrial development of the state in particular and the country in general.

The Faculty, like any other engineering Faculty in the country, has its own share of the shortage of academic staff, but it is to be noted that the Faculty staff strength is improving with the appointment of more lecturers into the Faculty within the last two years, coupled with attainment of higher degrees by staff in their various disciplines.

PHILOSOPHY OF THE DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

The philosophy of the department is in conformity with the overall philosophy of the university, in that, being basically a "developmental" university, the training of the students is such as to produce graduates that possess sound theoretical and practical skills that would make them self-reliant, confident and competent to contribute their quota to the socio-economic and technological development of the nation. Graduates of the department are expected to set their goals in life to be

self-employed and employers of labour rather than employees. They must be capable of being abreast of the global changes in technology in the field of electrical/electronic engineering and allied fields, by pursuing self-improvement programmes. As the world is currently undergoing "knowledge-based" industrial revolution in all sectors of the economy, graduates of the department are equipped to excel in the areas of application of Information and Communication Technology (ICT) and computer technology to the solution of developmental problems relating to electrical/electronic engineering practice.

OBJECTIVES OF THE DEPARTMENT

1. Offer training in basic engineering science and electronic engineering theory and practice;
2. To provide in-depth training in the following areas of the discipline: electrical power principles and systems, communications principles and systems, control and computers, electrical machinery;
3. During the course of training, to attach students to various industries outside the University for a Period Not less than 12 months, to enable them experience industrial practices and management in diverse areas of the profession, and relate their experiences to the theoretical aspects of their programmes. This Students' Industrial Work Experience (SIWES) programme is to be supervised by the lecturers during the period of attachment, and reports submitted by students at the end of the programme.
4. At the final year of the programme, the student is to undertake independent project, usually of the laboratory-based hands-on design and construction of practical engineering devices / equipment or computer-aided investigation of some fundamental concepts, on which the student writes a technical report in standard and acceptable format. Thereafter, the student must make oral presentation and defense of the project for proper grading. This forms an important component of the degree of B. Eng. awarded by the university.
5. To encourage participation of students in extracurricular professional activities such as the Nigerian Universities Engineering Students Association (NUESA), (IEEE), etc., as a prelude to their future involvement in the Nigerian Society of Engineers (NSE) activities upon graduation.

Inter-University Linkage/Corporation

A Linkage Agreement with Aalborg University Centre (AUC) Denmark was signed during the 2nd Semester of 1988/89 Session. The Linkage was financed by the European Union (EU). Under the agreement, Staff Exchange and equipment acquisition were provided from 1989/90 Session for three years.

Several members of staff benefited from this Linkage programme and utilized their research work to attain academic advancement. This project is still being looked into for another possibility of research co-operation, while efforts are being made into further research co-operation with France in their EduFrance programme, the Association of Common Wealth University (ACU) research programmes, the Japanese educational training programme, Cairo University etc.

UNDERGRADUATE PROGRAMMES

The Department runs the Bachelor of Engineering degree programme in Electrical and Electronic Engineering.

1 DURATION

The degree programme in Electrical and Electronic Engineering normally last five post Senior Secondary School Certificate or four years post GCE A/L or equivalent for full time students. The maximum period of study for the Bachelor honours degrees is seven years.

2. ADMISSION

Admission into B.Eng. degree in Electrical and Electronic Engineering can be through:

(i) The university matriculation Examination conducted by JAMB
(ii) The Pre-degree placement programme of Faculty of Science, EKSU
(iii) Concessional/Direct entry admission

2.1 Admission Requirements

Candidates seeking admission to the B.Eng. Honours degree in the Department must satisfy the admission requirements for entry into the University in general.
In addition candidates must fulfill the Department/Faculty requirements as may be prescribed from time to time. These requirements include:

(a)For 100L admission

(i) Five (5) credit passes in SSC examination, GCE O/L or equivalent obtained in not more than two sittings, including English Language, Physics, Chemistry, Mathematics and any other subject plus acceptable level of performance in the University Matriculation Examination (UME) and Post-UME test in these subjects.
(li) Five (5) credit passes in SSC examination, GCE O/L or equivalent obtained in not more than two sittings, including English Language, Physics, Chemistry, Mathematics and any other subject plus acceptable level of performance in the EKSU's Faculty of Science Pre-degree placement Examination and UME subjects in Mathematics, Physics, Chemistry and English Language.

(b) Direct Entry

Candidates may be admitted into the 200-level if they have:

(i) Five (5) credit passes in SSC examination, GCE O/L NECO or equivalent obtained in not more than two sittings, including English Language, Physics, Chemistry, Mathematics, and any other subject. Obtained passes at the GCE A level or equivalent in Physics, Chemistry, Mathematics (pure mathematics, applied mathematics, or pure and applied mathematics). Candidates with A level passes in Mathematics and Physics and 'O' level pass in Chemistry may be admitted.

(iii) Obtained National Diploma (ND) with at least Upper Credit in relevant field. All candidates must have the basic qualification of at least 5 credit at .SSC/WASC/8CE 'O' Level equivalent/ NECO Examination in not more than two sittings.

3. REGULATIONS GOVERNING FIRST DEGREE PROGRAMME UNIVERSITY EXAMINATIONS

3.1 Course Work

(a) Course and work experience shall be provided leading to a Bachelor's degree in Electrical and Electronic Engineering to be denoted by: B.Eng. The degree may be awarded at honours or pass level.

(b) Instructions shall be by courses and work experience. Students will be required to take an approved combination of courses and undergo appropriate work experienced as approved by Senate, on the recommendation of the Faculty Board, from time to time.

(c) Course shall be evaluated in terms of course units. One course unit shall be defined as one Lecture/tutorial contact hour per week, or one three-hour laboratory or practical class per week throughout a semester or an equivalent amount of assigned study or practical experience or any combination of the above.

(d) Work experience shall be evaluated in terms of industrial Units. One industrial unit is defined as one week of successfully completed industrial experience. Four industrial units will be equivalent to one course unit. (E) Courses shall be identified by Codes and shall be numbered by Level as follows:

Year 1	100 Level	101-199
Year 2	200 Level	201-299
Year 3	300 Level	301-399
Year 4	400 Level	401-499
Year 5	500 Level	501-599

Courses are identified by three letter codes as follows;

COURSES	**CODE**
Civil Engineering	CVE
Computer Engineering	CPE
Electrical and Electronic Engineering	EEE
Mechanical Engineering	MEE
Faculty courses	ENG
General studies	GST
Entrepreneurship	ESC

Students may take courses from other faculties as defined in the curricula.

(e) The following standard terminologies shall be used:

(i) Compulsory: Courses specified by the department which a student must take, and pass to obtain a degree.

(ii) Electives: Courses specified by the department from which a student can take in order to make up the required additional units for the award of the degree.

(iii) **Required:** Courses specified by the department from which a student must take but not necessarily pass, to obtain a degree

(iv) Prerequisite: A course whose knowledge is essential prior to taking another specified course.

(v) Concurrent: Specified courses which must be taken within the semester or has already been passed.

Appropriate prerequisite and/or concurrent requirement may be prescribed for course. A prerequisite is fulfilled by completing and passing the prerequisite or equivalent, except that a student who fails a course but obtains a score of between 35% and 39% in it shall be deemed to possess the course for prerequisite purposes but will not be credited with any unit in it. Pre-requisite course may also be waived for suitably qualified candidate by Senate on the recommendation of the Board of the Faculty of Engineering.

(ii) A concurrent requirement shall be satisfied if the student has either taken the course on a previous occasion or register for the course within the same semester.

(f) All courses taught during each semester shall be examined at the end of that semester, and students will be credited with the number of course units assigned to the course for which they have passed the examination.

(g) Full time students shall normally be required to register for a minimum of 12 course units and a maximum of 25 course units in any one semester, or a minimum of 24 courses units and maximum of 50 course units per session.

3.2 Load Units

(a) Students are to register for all their outstanding courses to be taught during the semester before they can register for the higher level courses within the permitted maximum number of units; and in due consideration of the outstanding courses which are pre-requisites to the next level courses.

(b) Students are strongly advised NOT to register for any course the prerequisite of which has not been passed. A student who registers for any course the prerequisite of which he has not passed shall, after such has been discovered, not be credited with his grade for the course.

(c) The minimum workload for an Electrical and .Electronic Engineering student is 12 units per semester and the maximum is 25 units.

(d) A student whose total number of outstanding course units is 15 and above for a semester is STRONGLY advised NOT to register for any higher level course.

(e) All students in the Department are required to pass all outstanding credit of carry-over courses (including GST) up to the end of the 300 level. Any student who fails to meet this requirement would be required to spend an additional period of one or two semesters to liquidate such outstanding courses before he/she could be allowed to register for 400 Level courses.

(f) The minimum work load for a fulltime student shall be -12 units per semester while the maximum shall be 25 units. In exceptional circumstances Senate may authorize a maximum of 28 units. However, a student with CGPA of less than 2.0 shall not be eligible for such consideration.

(g) No course shall carry less than one or more than four course units except for programmes such as Industrial experience.

(h) Students admitted for five-year degree programme shall normally start with 100 level courses while those admitted for the four-year degree programme shall normally start with 200 and compulsory University 100 level courses.

(i) Senate may, on the recommendation of the Faculty Board of Engineering permit student to start at other levels of courses.

3.3 Admission and Withdrawal from Courses

(a) Admission into courses closes at the end of the third full week of the semester or as stipulated by the Senate approved calendar.

(b) A student can withdraw from a course without penalty any time up to and including the seventh full week of the semester. Any student who withdraws after the seventh week will be deemed to have failed except in special cases approved by Senate.

(c) Students who transfer from other Faculties/Universities to the Department of Electrical and Electronic Engineering may apply toward degree requirements those units passed before transfers which are within the curriculum of the Department of Electrical and Electronic Engineering.

3.4 Continuous Evaluation

The progress of a student enrolled in a course is continuously assessed by means of test, written assignments, reports and/or such other means as may be appropriate and consistent with the objectives and conduct of the course and determined by the Department.

3.5 Assessing Industrial Training

The following procedure shall be adopted for the evaluation of the Work Experience of the students of the Department. For the evaluation of Industrial Units only the following shall be considered:

ENG190	SWEP I	4weeks	1 unit
ENG290	SWEP II	4weeks	1 unit
ENG490	SIWES 1	12 weeks	12 units
			Total 14 units

At the end of industrial Attachment every student v report with work diary certified by employer to be assess lecturers in the appropriate disciplines and the Industrial coordinator. The employer of the student shall give an assessment of the student performance during period. Every student shall be graded according to approved procedure by a Work Experience Examination Panel based on the assessment of his report by during the work and seminar and report by the coordinator.

3.6 Graduation Requirements

To be eligible for the award of a degree, a student must t a minimum total of course units specified by the De including those earned from industrial experience; 3 university course requirements, as follows.

DEPARTMENT	UME	DIRECT Entry
Electrical and Electronic Engineering	211	175

3.7 Examinations

(a) Each course shall be examined at the end of the semester in which it is offered.
(b) The duration of examination shall be no less than 1 hour in a one unit course, 2 hours for a 2 unit course and 3 hours for a course of 3 or more units. No examination shall be hours in duration.
(c) For each course, there shall be a panel of not less than two Internal Examiners, one of whom shall normally be the Head of Department who shall be designated the Chief Examiner.
(d) The panel shall set and moderate the questions and mark the answer scripts. Panel members shall also jointly sign the draft question papers and the examination results before the latter are submitted to the Examination Officer.
(e) The absence of one member of a panel shall not affect the validity of a draft question or an examination result.

3.8 Grading System

(a) Each course shall be graded on the basis of 100 total marks with proportions for continuous assessment and course examination as determined by the appropriate Board. In no case shall the proportion for continuous assessment be more than 30% of the full marks for that course.
(b) The basis on which marks are determined shall be announced at the first few meetings of each course and available for ready reference in the Department Office.
(c) The minimum pass mark in any course shall be 45% (D) for students admitted during the 2014/2015 academic session and 40% (E) for students admitted with effect from 2018/2019 academic session as shown in Tables A and B.
(d) No credit shall be awarded for any course in which a student fails.
(e) Students' scores are graded and assigned points as follows:

Table A: Grading system for students admitted in 2014/2015 academic session

Scores	Letter Grade	Grade point
70% above	A	5
60-69%	B	4
50-59%	C	3
45-49%	D	2
Below 44%	F	0

Table B: Grading system for students admitted with effect from 2018/2019 academic session

Scores	Letter Grade	Grade point
70% above	A	5
60-69%	B	4
50-59%	C	3
45-49%	D	2
40-44%	E	1
Below 40%	F	0

(f) External examiners shall be appointed to participate in the evaluation of all courses.
(g) Transcripts of examination scores shall be issued to students as appropriate at the end of each academic session, by the Registry.

3.9 Academic Standing

(a) To make normal progress toward the degree, each student must pass all courses specified in this curriculum and obtain a cumulative grade point average CGPA of at least 1 each semester
(b) Warning: If at the end of the 2rd semester of the 10OL year of studies in the University, a student falls below 1.00 CGPA, he or she will receive a warning.
(c) Probation: A student who is under "warning" and still falls below 1.00 GPA in a succeeding semester shall be placed on probation.

(d) **Withdrawal:**

(i) Any student on probation who falls below 1.00 CGPA in a succeeding semester shall be asked to withdraw from the Faculty,

(ii) If during the course of the programme, a student falls below CGPA of 1.00 for two consecutive semesters, he shall be asked to withdraw from the faculty.

(iii) If a student does not register for two consecutive semesters without Senate approval, he shall be asked to withdraw from the University.

3.10 Class of Degree

The class of degree to be awarded will be based on the final GPA attained at the end of the programme as follows:

CGPA	**CLASS OF DEGREE**
4.50-5.00	First Class Honours
3.50-4.49	Second Class Honours (Upper Division)
2.40-3.49	Second Class Honours (Lower Division)
1.50-2.39	Third Class Honours
1.00-1.49	Pass

4 PART I: THE ORGANIZATION OF EXAMINATIONS

1. Senate shall have control over all University examinations and shall exercise such powers as may be necessary to discharge these functions.

2. The Committee of Deans shall be responsible to Senate for the organization and the administrative arrangements for the University Examinations. The Registrar shall be the Secretary to the Committee.

3. Subject to the overall control of senate, exercised through the Committee of Deans under regulations (2) above, University examinations shall be conducted by Boards of Examiners appointed by Senate on the recommendations of the appropriate Faculty Boards.

Semester Examinations

4. All courses shall be examined in the Semester in which the courses end.
5. The dates of all Semester Examinations shall be fixed by the Senate. Such dates shall be published in the University Calendar.

Examination Entries and Time-Table

6. The Committee of Deans shall prescribe the appropriate forms for entries and also the closing dates for the receipt of such entries for all University examinations.
7. Candidate for any examination shall lodge his entry in the prescribed form with the Registrar not later than the closing date specified for the particular examination. All examination entries lodged after the closing date shall be subject to the payment of late entry fees and the approval of the Committee of Deans.
8. An Examination entry shall not be accepted unless
   (i) The Dean of the appropriate Faculty certifies that the candidate has satisfied all the requirements prescribed in the University regulations for the particular examination, or has been exempted from such requirements by the Senate on the recommendation of the appropriate Faculty Board and
   (ii) The Bursar certifies that the candidate has paid all the prescribed fees.
9. List of candidates who entered for any examination including the subject being taken, shall be published not later than two weeks before the commencement of the examination.
10. University examinations shall be held at the places and times specified in the examination Time-Table published by the Registrar. The examination shall be held on any day of the week except Sundays.
11. Draft Examination Time-Table shall be submitted by the Dean of each Faculty to the Committee of Deans before the end of each semester. The final examination Time-Table shall be pasted on University Notice Boards not later than two weeks before the commencement of the examination, and the room in which each examination will be held shall be indicated thereon.

Withdrawal of Entries

12. No student who has entered for an examination shall postpone or withdraw entry for that examination without the consent of the Dean of his Faculty, and such consent shall normally be given only on medical grounds.

Examination Accommodation

13. All University examinations shall be held in rooms approved by the Committee of Deans as suitable for the purpose. The rooms shall be prepared as follows:
(a) Seat for candidates shall be so arranged as to minimize the risk of cheating.
(b) The Registrar shall supply to the invigilator at each examination room, answer booklets and other approved examination materials.

Medical Attention

14. The Registrar shall arrange with the Director of Health Services for one of the University. Medical Officers to be call for the purpose of attending to candidates, for the whole period of the examination. The Chief Medical Officer shall also establish one or more First Aid posts within close proximity of the examination rooms to deal with emergencies.

Invigilation

15. The Committee or Deans shall appoint invigilators for each session of an examination from among the academic staff.

16. An invigilator shall be allocated for an average of fifty candidates provided that there shall be at all-time not less than two invigilators in each room. One of the invigilators shall be designated senior invigilator for an examination room and at least one attendant shall be allocated to each examination room.

17 (i) The Chief Invigilator assigned to each examination room shall be there at least 20 minutes before the commencement of the examination. The other invigilators shall be in the rooms assigned to them not later than 30 minutes before the commencement of the examination, and shall ensure that rooms are ready for the use of candidates. The internal arrangement in each examination room prior to the commencement of the examination shall be the responsibility of the Registrar. Not earlier than 30 minutes before the commencement of the examination, the Registrar shall supply the following to the Senior Invigilator: answer booklets, attendances sheets, threads and other examination materials, while the chief examiner shall supply the question papers.
(ii) At least 5 days before the commencement of the Examination the Registrar shall send to all Invigilators: Time-table and examination instructions.

18. The time appointed for the examination in each paper as indicated in the examination. Time-table must be strictly adhered to.

19. Each of the sealed packets of question papers must be held up and shown to the candidates and opened in their presence at the time appointed for the commencement of the examination in the subject to which the packet relates.

20. It shall be the duty of the Chief Examiner in the paper to arrange for one of the examiners to be present for the first thirty minutes of the examination to clarify any doubts in connection with the question papers. In case of doubts, reference should be made to the chief examiner in the subject.

21. After the first hour has lapsed, the senior invigilator shall check and sign the attendance sheets in duplicate; these shall be considered the final list. The original will be kept by the invigilator while the Registrar will collect the duplicate.

22. While the examination is in progress, no persons other than the invigilators, the attendants, the Registrar or his representative and Medical Officers shall be allowed to enter the examination room except that the examiner in each paper shall be present during the first thirty minutes .of the examination and/or such other time as may be requested.

23. The senior invigilator and other invigilators shall maintain constant vigilance throughout the examination session at which they are in attendance. Senior invigilators shall consider any misconduct or any irregularity that may be brought to their notice in connection with the examination, and shall act according to Regulation 28 and 34 under Examination Offences. They shall also send a report of each case to the Vice Chancellor with a copy to the Registrar immediately on the completion of the paper in respect of which the misconduct took place.

24. At the close of an examination, candidates shall be asked to hand over their answer scripts to the invigilators and not to leave them on the desk for invigilators to collect. Invigilators should move from row to row collecting the scripts from candidates and on no condition should candidates be allowed to leave the room while their scripts are lying on their desks. The senior invigilator shall check the candidates answer booklets against the attendance list for the particular examination and arrange the answer boxes in numerical order. He shall then parcel and send the answer booklets together with four copies of the relevant question paper and the copy of the signed attendance sheet and deliver them to chief examiner or his representative in attendance. The senior invigilator must ensure that the attendant returns all unused answer books to the Registrar.

25. University examiner shall, as soon as practicable after a particular session, collect answer booklets from the Chief Examiner or his representative.

26 (i) No candidate shall be allowed to enter an examination room earlier than ten minutes before the commencement of the examination.

(ii) Thirty minutes after the examination has commenced, no student shall be allowed to enter the examination hall and participate in the examination. Also no student will be allowed to leave the examination room earlier than 30 minutes after the commencement of the examination.

(iii) Any candidate who seeks entry into the examination room after the first thirty minutes may be allowed to do so by the senior invigilator, but such cases be reported in write through the Registrar to the Committee of Deans.

27 No candidate shall take into an examination room or have in his possession during an examination any book or paper or printed or written documents; whether relevant to the examination or not, unless specifically authorized to do so. An invigilator has authority to confiscate such document.

28. A candidate shall not directly or indirectly
    (i) give any assistance to any other candidate
    (ii) accept any assistance from any other candidate.

29. A candidate shall not remove from an examination room any paper used or unused, except the question paper and such book and papers, if any as he is authorized to take into the examination room.

30. A candidate shall not be allowed during an examination to communicate by word or otherwise with any other candidate nor shall he leave his place except with the consent of an invigilator. Should a candidate act in such a way as to disturb or inconvenience other candidates, he shall be warned and if he persists he may at the discretion of the senior invigilator be excluded from that examination room.

31. A candidate shall comply with all directives to candidates set out on an examination answer book or other examination materials supplied to them, and shall comply with directives given to him by an invigilator.

32. Candidates shall not write on any paper other than the examination answer. All rough work must be done in the answer books and crossed out neatly. Supplementary answer books, even if they contain only rough work, must be tied inside the main answer books.

33. When leaving the examination room a candidate shall not leave his written work on the desk but he shall hand it over to an invigilator. Candidates are responsible for the proper return of their written work.

34. Smoking shall not be permitted in examination rooms during examination sessions.

Examination Offences

35 Examination, on and off campus offences and penalties

(a) Misconduct before examination

1. Misconduct: Involvement in and bearing responsibility for examination question leakage.
   Penalty: Expulsion from the University.
2. Misconduct: Participating in or benefiting from question leakage.
   Penalty: Expulsion from the University.
3 Misconduct: Attempting to participate in and or benefit from examination question leakage.

Penalty: Suspension for two (2) semesters.

4 Misconduct: Coming into the examination hall within thirty (30) minutes of the commencement of an examination.
Penalty: The candidate shall be allowed into the examination hall but he/she not given extra time.

5. Misconduct: Coming into the examination hall latter than thirty (30) minutes after the commencement of an examination.
Penalty: Candidate shall be allowed into the examination hall but he/she be scored 0 (F) in the course examined.

b) Misconduct during Examinations

6. Misconduct: Sitting for an examination for which a candidate did not register for or qualified to sit for
Penalty: The result of the candidate in the course shall be nullified. He/she, shall be scored 0 (f) and be issued a letter of warning.
7. Misconduct: Representing/standing in for another in the course of an examination. Penalty: Expulsion from the university.
8. Misconduct: Conniving with another candidate/student/person to represent/stand .in for another in an examination.
Penalty: Expulsion from the university
9. Misconduct: Destroying, defacing, mutilating, and swallowing of potentially incriminating material relating to a course during the course of an examination.
Penalty: Suspension for two (2) semesters, in addition, the candidate shall be scored 0 (F) in the course.
10. Misconduct: Displaying of inappropriate or antisocial behaviour (e.g. smoking, singing, cat calls, etc) capable of causing delay and/or disruption of an examination process.
Penalty: Suspension for one (1) semester.
11. Misconduct: Displaying of inappropriate or anti-social behaviour leading to disruption and suspension of an examination.
Penalty: Suspension for two (2) semesters.
12. Misconduct: Giving or receiving, or in any way benefiting from information relating to a course in an examination through electronic, personal dress material, part of the body in any manner or form whatsoever.
Penalty: Suspension for two (2) semesters.
13. Misconduct: Leaving the examination hall without the permission of the invigilator.
Penalty: Letter of warning. In addition, the candidate shall be scored 0 (F) in the course examined.
14. Misconduct: Leaving the examination hall with examination material before the end of the examination without the permission of the invigilator
Penalty: Suspension for two (2) semesters.
15. Misconduct: Substituting or exchanging the answer script given to a candidate in whatever manner or form, during the examination.
Penalty: Expulsion of all the students involved from the University.
16. Misconduct: Exhibiting insulting, rude, impolite behaviour to another student during the course of an examination.

Penalty: Letter of warning

17. Misconduct: Exhibiting insulting, rude, impolite behaviour to a staff during the course of an examination.
    Penalty: Suspension for two (2) semesters.
18. Misconduct: Physical assault on another student during the course of an examination. Penalty: Suspension for two (2) semesters.
19. Misconduct Physical assault or battery on staff during the course of an examination. Penalty: Expulsion from the university.
20. Misconduct: Talking to or communicating with another candidate without due permission during the course of an examination.
    Penalty: Letter of warning.
21. Misconduct: Bringing in unauthorized materials(s) into the examination hall by a candidate-without proven evidence of using the material(s).
    Penalty: Suspension for one (1) semester. The candidate shall also be scored 0 (F) in the course.
22. Misconduct: Bringing in unauthorized materials (s) into the examination hall by a candidate with proven evidence of using the material(s) or any part thereof.
    Penalty: Suspension for two (2) semesters. The candidate shall also be scored 0 (F) in the course.
23. Misconduct: Failure by a candidate to submit his/her answers script after taking part in an examination. Penalty: Suspension for two (2) academic semesters. In addition, the candidate shall be scored 0 (F) in the course.
24, Misconduct: Giving/receiving irregular assistance, cheating or aiding and abetting by a candidate/student in an examination.
    Penalty: Suspension for two (2) semesters.
24b. Misconduct: Refusal to sign the attendance registers during examination.
    Penalty: Warning

(c) Misconduct after Examination

25. Misconduct: Involvement in an attempt, to substitute or change or remove or effect changes in examination script(s) record sheet(s), attendance register or any examination related material/document.
    Penalty: Expulsion from the university.
26. Misconduct: Gentle/subtle exertion of influence with a view to obtaining undue advantage in the grading of scripts or award of marks on an internal or external examiner. Penalty: Letter of warning.
27. Misconduct: Non-gentle/non-subtle exertion of influence with a view to obtaining undue advantage in the grading of scripts or award of marks on an internal or external examiner. Penalty: Expulsion from the university.

(d) **Misconduct On-Campus**

28. Misconduct: Display of inappropriate or anti-social behaviour (e.g smoking, singing, cat calls, etc) capable of causing delay or disruption of class work, tutorials, lectures, laboratory work, etc.
    Penalty: Suspension for one (1) semester
29. Misconduct: Display of inappropriate or anti-social behaviour (e.g smoking, singing, cat calls, etc) capable of causing delay or disruption leading to suspension of school activities (class work, tutorial, lecture, etc).
    Penalty: Suspension for two (2) semesters.
30. Misconduct: Insulting, rude, impolite behaviour to staff in department or general offices.
    Penalty: Suspension for two (2) semesters
31. Misconduct: Physical assault or battery on staff in the departmental or general office.
    Penalty: Expulsion from the university.
32. Misconduct: Willful damage to any university property or staff and student property
    Penalty: Student shall pay cost of replacement, and be suspended for one (1) semester.
33. Misconduct: Non- willful damage to any university property or staff and student property
    Penalty: Student shall pay cost of replacement.
34. Misconduct: Physical assault or battery on a member of the community within the university premises.
    Penalty: Expulsion from the university

(e) Off-campus student behaviour/misconduct

35. Misconduct: Insulting, rude, impolite behaviour on another student outside the university premises Penalty: Letter of warning
36. Misconduct: Physical assault or battery, on another student outside the university premises Penalty.' Expulsion from the university
37. Misconduct: Exhibiting abusive, rude, impolite behaviour by student or group of student on staff outside the university premises
    Penalty: Suspension for two (2) semesters
38. Misconduct: Physical assault or battery on staff outside the university premises Penalty: Expulsion from university.

(f) General

39. Misconduct: Obstruction of motorways on campus or off campus during or after regularly school hours.
    Penalty: Letter of warning.
40. Misconduct: Riotous behaviour on campus or off campus in bus/taxi cabs. Bus stops, in the hotel or classroom. Refusal to pay bus/taxi fare on campus or off campus premises.
    Penalty: Suspension for one (1) semester
41. Misconduct: Worshipping or holding religious activities in unauthorized, unapproved places, day or night on campus premises
    Penalty: Letter of warning.

42. Misconduct: Luring/imprisoning falsely a fellow student or a member of staff against his or her wish.
    Penalty: Expulsion from the university
43. Misconduct: Indecent assault of a female or male or forceful unsolicited sex of another student
    Penalty: Expulsion from the university
44. Misconduct: Sexual harassment of a staff by a student
    Penalty: expulsion from the university
45. Misconduct: Chanting war songs or shouting or slogans by students or group of organized student anywhere on campus or off campus with an intention to caused disruption to university activities
    Penalty: Suspension for one (1) semester
46. Misconduct: Unsolicited illegal entry of a male student into the female hostel or vice-versa
    Penalty: Letter of warning
47. Misconduct: Removal of minor personal items or article from public place.
    Penalty: Student shall pay cost of replacement of the item or article and be suspended for two (2) semesters.
48. Misconduct: Fraud, advance fee fraud, embezzlement by any student or group of students.
    Penalty: Such student(s) shall be sanctioned as appropriate under the university enabling laws subject to the operating laws in the country.
49. Misconduct: Student/candidate who had been issued a letter of warning on account of examination misconduct or other culpable or blameworthy act.
    Penalty: suspension for one (1) semester
50. Misconduct: A student/candidate who had been suspended for one semester on account of examination malpractice or other offence.
    Penalty: Suspension for two (2) semesters
51. Misconduct: A student/candidate who had been suspended from the university for one session and was subsequently found culpable of any other blameworthy act or examination misconduct
    Penalty: Expulsion from the university
52. Misconduct: Staff member accused or involvement in any of the acts of examination misconduct.
    Penalty: Referral to the appropriate university investigation/disciplinary committee for appropriate action.

22.1. Dress Code

53. Misconduct: Indecent exposure of vital parts of the body e.g thighs, back, chest and abdomen (including the naval) in classroom, laboratory, lecture theatre, school/Department offices and University buildings
    Penalty: Letter of warning
54. Misconduct: Covering up of the face such that the student cannot be identified in the classroom, laboratory, lecture theatre, or at any official academic events.
    Penalty: Such student shall be prevented from participating in receiving lecture, taking part in-classroom/laboratory activities, workshops, seminars, etc.

55. Misconduct: Covering up of the face such that the student cannot be identified in the school/department offices and general university building.
Penalty: Such student shall not be attended to by the staff and he/she shall be sent off from the school/department offices and general university.

22.2 Penalty for frivolous allegation in an application for review of marked script

56. Misconduct: Frivolous allegation: making an application for revision of marked scripts by a student which lacked merit but with no imputation of victimization of male violence
Penalty: Letter of warning
57. Misconduct: Malicious allegation: making an application for revision of marked scripts by a student with imputation of victimization or male violence
Penalty: Suspension for two (2) semesters.

Absence from Examination

58 Candidates must present themselves at such University Examinations for which they have registered under these Regulations. Candidates who fail to do so for reasons other than illness or accident shall normally be deemed to have failed that examination. Misreading of the Time-table shall not be accepted as a satisfactory explanation for absence,

59 Any candidates who on account of illness is absent from University Examination other than a Final Examination may be permitted by the Senate after considering a report from the appropriate Faculty Board, to present after considering himself for such examination at a future date provided that:

60 (i) The illness has been reported to the Registrar; and
(ii) The student has been examined by the University Medical Officer or a Medical Report submitted to the Registrar within a reasonable period, normally forty-eight hours of the absence under this Regulation.

Use of Typewriter or Dictation of Answers

61. When a candidate in any University examination, for special medical reasons, desires to use typewriter or to dictate his answer, the Registrar shall after consultation with the Director of Medical Services, arrange for typing or dictation of his answer under supervision at the candidate's expense.

PART II: THE CONDUCT OF EXAMINATION

1. Examinations for degrees, diplomas, certificates and other awards of the University shall be conducted by examiners appointment by the Senate on the recommendation of the appropriate Faculty Board or institute. In respect of such examination which counts towards the award of degrees, Final Year Examination, as may be prescribed by the Senate, shall have at least one External Examiner.

2 (i) All appointed of University Examiners shall be made at the first meeting of the Senate in each academic year, provided that such appointments may be modified by the Senate as recommended by the Faculty Boards or Academic Boards.

(ii) In the event of any emergency, the Vice Chancellor may on the recommendation of appropriate Dean of a Faculty, appoint an examiner to fill a vacancy provided always that such action is reported to the Senate for ratification,

3. External Examiners shall be appointed annually by the Senate on the recommendation of the Faculty or Academic Board concerned and shall be eligible for reappointment provided that no External Examiner shall normally be appointed for more than three consecutive years. At the time of nomination of External Examiners, their degrees, relevant professional qualifications, University title and/or current academic appointments shall be stated.

4. It shall be the duty of the External Examiners to assist in the conduct of the examinations for which they have been appointed and in particular

(i) To scrutinize draft question papers and to satisfy themselves that the questions papers are appropriate, having regard to the approved syllabus for the course being examined at the level of the examination; and to recommend such alterations or modifications to the papers as they may think desirable. All 500 level question papers must be signed by the External Examiner.

(ii) To mark or revise the marking of scripts in consultation with the Chief Examiner in the subject.

(iii) To assess practical or oral test in consultation with the Chief Examiner in the subject.

(iv) To participate in the determination of results and to advise in cases of disagreement among University Examiners in consultation with Chief Examiner.

(v) To submit to the Vice Chancellor, on the completion of each examination, a confidential report on the examination, in the subject with particular reference to the following points:

(a) The general standard of the Examination and the performance of the candidates;

(b) The standard of marking by the University examiners;

(c) A critical appraisal of the conduct of the Examination with suggestions for improvement on future occasions.

Remuneration to External Examiners:

5. External Examiners shall be paid at rates approved by the University from time to time. The University will also be responsible for the following:

The cost of postage of draft question papers, economy class return air ticket, first class rail return passage or mileage claims for road transport at the approved University rate per kilometer as well as a hotel bills while visiting the University for the Examination.

Question Papers

7. All question papers shall be signed by the Chief Examiner, at least one of the University Examiners concerned and where there is as External Examiner by the External Examiner as well.

8. The Chief Examiner in each subject shall be responsible for the correctness of the question papers. All corrected proofs must be signed by the Chief Examiner or one of the University Examiners.
9. Maps, drawings, photographs, sketches and any other materials needed for the reproduction in question papers must be sent in a form which can reproduce without modification and must be submitted along with the question papers.
10. All Examiners are required to strictly preserve the secrecy of question papers at ail stages until after the examination. The contents of question papers must not be disclosed to any person other than fellow examiners in the same subject or an official of the University specially appointed to deal with question papers.

Answer Scripts

11. External Examiners shall participate in the marking of scripts, assessment of practical tests and determination of examination results. In exceptional circumstances when the external examiner is unable to show up, the Chief Examiner shall arrange for delivery of marked answer scripts to the External examiner and under no condition should the scripts be forwarded by post.
12. The authorized marking scheme for University Examination is that approved by the Senate and it is the duty of the Chief Examiner to ensure that this scheme is strictly adhered to.
13. On the completion of the examinations, answer scripts shall be retained by the Chief Examiner for at least five years before they are destroyed.

Board of Examiners

14. The Board of Examiners of a Faculty shall be constituted as follows:
    (a) The Dean of the Faculty as Chairman
    (b) The Chief Examiners and all other University Examiners in the Faculty, the relevant External Examiners, where possible.
15. The function of the Board of Examiners of a Faculty shall be:

To consider and ratify the marks, and in final examinations, the classifications recommended by Departmental Boards Examiners and recommend to the Faculty Board which will then recommend to Senate for approval.

16. The functions of the Departmental Board of Examiners in respect of each final or professional examination which counts towards the classification of degrees shall be:

(i) To consider the, marks allotted to candidates for individual papers,

(ii) To confirm the marks for the candidates for the whole examination, and the classification of results.

iii) To make recommendations to Faculty Board of Examiners.

OUTLINE OF COURSES
GENERAL COURSES

Grouping	Course No/Level	Course/Subject	Pre-requisite	Contact Hours/Week			Total Work Load
				Lecture	Tutorial	Practical	
(a) General Studies Courses, e.g. Humanities, Communication and Social Sciences	GST 111	Communication in English		2	0	0	2
	GST 112	Use of Library and Study Skills		2	0	0	2
	GST 113	Nigerian Peoples and Culture		2	0	0	2
	GST 116	Entrepreneurial Studies		2	0	0	2
	GST 118	History and Philosophy of Science		2	0	0	2
(b) Core/Compulsory Courses	**100 Level – First Semester**						
	MAT 101	Algebra and Trigonometry		2	1	0	3
	MAT 103	Introductory Calculus		2	0	0	2
	PHY 101	General Physics I (Mechanic)		2	1	0	3
	PHY 103	Properties of Matters		2	1	0	3
	PHY 107	General Physics Laboratory I		0	0	3	1
	CHE 101	General Chemistry I		2	1	3	4
	ENG 131	Technical Drawing I		1	0	3	2
	100 Level – Second Semester						
	MAT 102	Vectorial Mechanics		2	1	0	3
	PHY 102	General Physics II (Electricity & Magnetism)		2	1	0	3
	PHY 104	Modern Physics & Electronics		2	1	0	3
	PHY 108	General Physics Laboratory II		0	0	3	1
	CHE 102	General Chemistry II		2	1	3	4
	ENG 132	Technical Drawing II		1	0	3	2
	ENG 190	SWEP I				4 Weeks	1
	200 Level – First Semester						
	ENG 201	Introduction to Science of Materials		2	0	0	2
	ENG 211	Basic Fluid Mechanics		2	0	0	2
	ENG 221	Basic Electrical Engineering I		2	1	0	3
	ENG 223	Computer Architecture		2	1	0	3
	ENG 231	Engineering Drawing I	,	1	0	3	2
	ENG 233	Engineering Mechanics I (Statics).		2	0	0	2

Grouping	Course No/Level	Course/Subject	Pre-requisite	Contact Hours/Week			Total Work Load
				Lecture	Tutorial	Practical	
	ENG 235	Engineering Thermodynamics I		2	0	0	2
	ENG 261	Workshop Technology I		0	0	6	2
	ENG 281	Engineering Mathematics I		2	1	0	3
	ESC 211	Introduction to Entrepreneurial Skills		1	0	0	1
	200 Level – Second Semester						
	ENG 202	Strength of Materials		2	1	0	3
	ENG 222	Basic Electrical Engineering II		2	1	0	3
	ENG 224	Structured Computer Programming		1	0	3	2
	ENG 232	Engineering Drawing II		1	0	3	2
	ENG 234	Engineering Mechanics I (Dynamics)		2	0	0	2
	ENG 262	Workshop Technology II		0	0	6	2
	ENG 282	Engineering Mathematics II		2	1	0	3
	ENG 284	Engineers in Society		2	0	0	2
	ENG 290	SWEP I				4 Weeks	1
	300 Level – First Semester						
	ENG 341	Computer Programming and Applications		1	0	3	2
	ENG 381	Engineering Mathematics III		2	1	0	3
	ENG 383	Industrial & Project Management		2	0	0	2
	EEE 351	Electrical Machines I		2	1	0	3
	EEE 311	Circuit theory 1		2	1	0	3
	EEE 361	Electrical/ Electronic Laboratory Practical		0	0	2	2
	EEE 321	Semiconductor Devices		2	0	0	2
	EEE 331	Electromagnetism		2	1	0	3
	ESC 311	Practice of Entrepreneurship I		1	0	3	2
	300 Level – Second Semester						
	ENG 342	Advanced Computer Applications	ENG 224	1	0	1	2
	ENG 382	Engineering Mathematics IV	ENG 282	2	1	0	3
	ENG 384	Engineering Law and Managerial Economics		2	0	0	2
	EEE 312	Measurement and Instrumentation	ENG 233/234	2	0	0	2
	EEE 314	Circuit Theory 2		2	1	0	3
	EEE 322	Electronic Circuits	ENG 211	2	1	0	2
	EEE 332	Electromagnetic Waves and Circuits	ENG 235	2	1	0	3

Grouping	Course No/Level	Course/Subject	Pre-requisite	Contact Hours/Week			Total Work Load
				Lecture	Tutorial	Practical	
	EEE 352	Electrical Machines 2	ENG231/232/ 202	2	1	0	3
	EEE 362	Electrical & Electronic Laboratory Practical		0	0	2	2
	EEE 372	Introduction to Entrepreneurship studies		1	0	1	2
	400 Level – First Semester						
	ENG 481	Engineering Mathematics V	ENG 382	2	1	0	3
	ENG 483	Maintenance Management		2	0	0	2
	EEE 401	Electrical Engineering Materials		2	0	0	2
	EEE 421	Advanced Electronics		2	0	0	2
	EEE 431	Communication Principles		2	1	0	3
	EEE 441	Control Theory		2	1	0	3
	EEE 451	Electric Power Principles		2	1	0	3
	EEE 443	Microprocessors		2	1	0	3
	EEE 461	Electrical and Electronic Laboratory III		2	0	0	2
	400 Level – Second Semester						
	ENG 490	SIWES				12 Weeks	12
	500 Level – First Semester						
	EEE 511	Advanced Circuit Techniques		2	0	0	2
	EEE 513	Electronic Instrumentation		2	0	0	2
	EEE 521	Power Electronics		3	0	0	2
	EEE 531	Telecommunication Engineering		2	1	0	3
	EEE 541	Computer Engineering 1		2	1	0	3
	EEE 551	Electrical Power System 1		2	1	0	3
	EEE 571 EEE 581	Final Year Project Electrical Services Design		0 2	0 0	9 0	3 2
	500 Level – Second Semester						
	EEE 522	Advanced Electronics		2	1	0	3
	EEE 534	Introduction to Digital Communications		2	0	0	2
	EEE 542	Computer Engineering 2		2	1	0	3
	EEE 552	Electrical Power system 2		2	0	0	2
	EEE 572	Final Year Project		0	0	9	3
	EEE 582	Reliability and Maintainability		2	0	0	2

Grouping	Course No/Level	Course/Subject	Pre-requisite	Contact Hours/Week			Total Work Load
				Lecture	Tutorial	Practical	
	ENG 582	Technology Policy and Planning		3	0	0	3
	500 Level – First Semester Electives (One Only)						
	EEE 523	Solid state Electronics		2	0	0	2
	EEE 537	Introduction to Digital signal processing		2	0	0	2
	EEE 545	Analog and Digital Computers		2	0	0	2
	EEE 555	Power systems planning and Optimization		2	0	0	2
	EEE 557	Power system protection		2	0	0	2
	EEE 553	Electric Drives		2	0	0	2
	500 Level – Second Semester Electives (One Only)						
	EEE 554	Power system communication and control		2	0	0	2
	EEE 556	Electrical Energy Dynamics		2	0	0	2
	EEE 536	Communication system Engineering		2	0	0	2
	EEE 544	Control system Engineering		2	0	0	2
	EEE 538	Telecommunication services Design		2	0	0	2
	EEE 546	Advanced computer programming and statistics		2	0	0	2
	EEE 558	Electromechanical Devices design		2	0	0	2
	EEE 526	Industrial Electronics Design		2	0	0	2

COURSE CONTENTS
COMMON GENERAL STUDIES AND BASIC SCIENCE COURSES

GST 111:Communication in English I (2,0,0) 2units

Effective communication and writing in English,language skils,writing of essays.Comprehension.Introduction to tenses.Sentence construction,outlines and paragraphs.Collection and organisation of materials and logical presentation of papers Punctuation.Public speaking and Oral presentation.

GST112: Use of Library and Study Skills (2,0,0) *2* Units

Brief history of libraries, Library and education, University libraries and other types of library, Study skills (reference services). Types of library materials. Using library resources including e-learning, e-materials etc. Understanding library catalogues (card, OPAC, etc) and classification. Copyright and its implications. Database resources, Bibliographic citations and references.

GST 113: Nigeria Peoples and **Culture *(2,* 0, 0) 2 Units**

Study of Nigerian history, culture and in re-colonial times. Nigerian's perception of his world. Culture of Nigeria and their characteristics. Evolution of Nigeria as a political unit. Indigene/settler phenomenon. Concepts of trade, Economic self-reliance, social justice, individual and national development, norms and values, Negative attitudes and conducts (cultism and related vices) reorientation of moral and national values, moral obligations of citizens, environmental problems.

GST 116: Entrepreneurial Studies (2,0,0) 2 Units

Introduction to entrepreneurship and new venture creation, entrepreneurship in theory and practice. The opportunity, forms of business, staffing, marketing and the new venture, determining capital requirements, raising capital, financial planning and management. Starting a new business, feasibility studies, innovation, legal issues, insurance and environmental considerations, possible business opportunities in Nigeria.

GST 118: History and Philosophy of Science (2,0,0) 2 Units

Man-his origin and nature, man and his cosmic environment; scientific methodology; science and technology in the society and service of man; renewable and non-renewable resources, man and his energy resources. Environmental effects of chemical plastics, textiles, wastes and other materials. Chemical and radiochemical hazards. Introduction to the various areas of science and technology.

CHM101: General Chemistry 1(2,1,1) 4 Units

Atoms, molecules and chemical reactions: chemical equations and stoichiometry; atomic structure and periodicity; modern electronic theory of atoms; radioactivity; chemistry bonding; properties of gases; equilibria and thermodynamics; chemical kinetic electrochemistry.

CHM102: General Chemistry II (2,1,1) 4 Units

Historical survey of the development and importance of organic chemistry, nomenclature and classes of organic compounds; homologous series; functional groups isolation and purification of organic compounds; qualitative and quantitative organic compounds determination or structure of organic compounds, saturated hydrocarbons, unsaturated hydrocarbons, periodic table and periodic properties; valence force, structure of solids. The electricity of selected metals and non-metals, qualitative and quantitative analysis.

MAT 101: **Algebra and Trigonometry (2,1,0) 3 Units**

Elementary set theory, subsets, union, intersection, complements, venn diagrams, real numbers, induction, real sequences and series, theory of quadratic equations. Binomial theorem, complex numbers, algebra of complex numbers - the Argand diagram, De Movie's theorems, n-th roots of unity, circular measure, trigonometric functions of angles of any magnitude, addition and factors formulae.

MAT 102: Vectorial Mechanics (2,1,0) 3 Units

Geometric representation of vectors in 1-3 dimensions, components, direction cosines. Addition, scalar multiplication of vectors, linear independence, scalar variable, two-dimensional co-ordinate geometry, straight lines, circles, parabola, ellipse, hyperbola, tangents and normals, kinematics of particle, components of velocity and acceleration of a particle moving in a plane. Force, momentum, laws of motion under gravity, projectiles, resisted vertical motion, elastic strings, simple pendulum, impulse, impact of two smooth spheres, and of a sphere on a smooth sphere,

MAT 103: Introductory Calculus (2,1,0) 3 Units

Functions of a real variable, graphs, limits and idea of continuity. The derivative as limit of rate of a change. Techniques of differentiation. Extreme and curve sketching: integration as an inverse of differentiation, methods of integration. Definite integrals application to areas and volumes.

PHY101: General Physics I (Mechanics) (2,1, 0) 3 Units

Space and time frames of reference, units and dimension, kinematics, fundamental laws of mechanics, statics and dynamics, Galilean in variance, universal gravitation, work and energy, rotational dynamics and angular momentum, conservation laws.

PHY 102: General Physics U (Electricity and Magnetism) (2,1,0)3 Units

Electric charges and forces, Coulomb's law, Gauss's law, electric energy and potential, storage of charge, storage of electric energy in a capacitor, capacitance, dielectrics, polarization, electric displacement, current vctor, E.M.F. and D.C. Circuits, charging and discharging of capacitor, Ohm's and Kirchoffs laws, thermal and magnetic effects of currents, Ampere's law and its application, Biot-savart law, magnetic properties of matter, intensity of magnetism, magnetic forces, electromagnetic induction-and power generation, motors and dynamos, inductance. Oscillating currents, simple AC circuits, Resonance, electromagnetic waves.

PHY103: Properties of Matter (2,1,0) 3 Units

Molecular treatment of properties of matter, elasticity Hooke's law, Young's shear and bulk moduli. Hydrostatics pressure; Buoyancy, archimedes[1] principles Hydrodynamics, streamline, Bernoulli and continuity equations, turbulence, Reynolds' number, Viscosity, Laminar flow, Poiscuille's equation. Surface tension; adhesion, capillarity, drop and bubbles. Temperature; the zero the law of thermodynamics; heat; gas laws; laws of thermodynamics kinetic theory of gases. Applications.

PHY 104: Modern Physics and Electronics (2,1,0) 3 Units

Conduction of electricity through gases. Cathode rays, properties of cathode rays, production, properties and uses of x-rays, Moseley's law. Thermionic emission; applications, the diode and triode, Milikan's oil drop experiment. Quantum physics, quantization of radiation, photoelectric effect. Wave-particle behaviour compton effect, Atomic structure and Spectra; isotopes. Mass spectrometer, Bohr's theory of hydrogen atom, Balmer series, Lyman series etc.

Rydberg constant, Nuclear structure, constituents and binding energy, Nuclear forces and Models, radioactivity, properties and characteristics of radiation. Decay law, decay constant and half-life, interaction of radiation with matter; detection of radiation, application of radiation in medicine and industry, Nuclearfission and nuclearfusion. Reactors.

PHY 107/108: Practical Physics I/II (0,0,1) 1 Unit each

This introductory course emphasizes quantitative measurements, the treatment of measurement, errors, and graphical analysis. A variety of experimental techniques will be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems light, heat, viscosity, etc. covered in PHY101, PHY102, and PHY103.

ENTREPRENEURSHIP COURSES

ESC 111: Introduction to Entrepreneurship I

Graduate Unemployment and Unemployment Issues: Intervention through Entrepreneurial Skill Development Process, Youth Entrepreneurship, Entrepreneurship thought and Idea Generations (30%)
Skill Acquisition: Practical (70%)

ESC 211: **Introduction to Entrepreneurship II**

Entrepreneurship and gender related Issues, qualities, features and roles of successful entrepreneurs, Environment for successful entrepreneurship practice, classification of entrepreneurship and constraints of launching business, theories of entrepreneurship development, preparation of business plan, first steps for new entrepreneurs, family business, introduction to venture capital, introduction to capital market.

ESC 211: **Skill Acquisition: Practical (100%)**

COMMON FACULTY COURSES

ENG131: Technical Drawing 1 (1,0, 1) 2 Units

General: Use of Drawing instruments, standard drawing sheets, layout and border lines, types of lines, formats, title blocks, lettering, basic dimension, drawing office, practice and organisation for reproduction, filing and documentation of drawings.

Geometrical construction: Bisection of lines and angles, construction of triangles, quadrilaterals, regular polygons, circles, chords, sectors, and tangents. Centre of an arcs through a given point curves joining techniques, construction of scales and monographs - logarithmic scales. Loci, methods of construction ellipses, parabolas and hyperbolas. Construction of cy'closdal curves, involutes, Archimedean spiral, helices-single and double start square threads and springs.

Development: Development of surfaces, application of geometry to making out development, use of templates and patterns Development of solids, hexagonal prisms, cylinders, pyramids, frustum of cones.

ENG 132: Technical Drawing II (1,0,1) 2 Units

Further Development: Spheres and their sectional development by triangulation, practical development of ducts, machine guards, containers, hopper and spherical surfaces, curves of insertion. Interpretation of common solids.

Projection: Lines and planes in space. First and third angle projections. Auxiliary protection, Isometric, oblique and axonometric protections. Drawing of bolts, nuts, studs, screw threads, rivets and riveted joints, keys, pin and others. Drivers: drawing of couplings, pulleys and chains sprockets, gears, cams, simple bearings and brackets.

ENG 190: SWEP I

4 weeks of Workshop Practice

ENG 201 Introduction to Science of Materials (2,0,0) Units

General classification of materials based on atomic and crystal structure. Atomic bondind, imperfections, slip-lines dislocations. Mechanical properties or materials, fracture stress yield stress of elastic and plastic materials. Ductility, impact strength, hardness, creep -and fatigue properties, chemical properties such as corrosion phenomena, control and prevention of corrosion. Alloying theory and solidification cooling-curves illustrated by simple phase-diagram e.g Fe-c diagram.

ENG 202: Strength of Materials (2,1,0) 3 Units

Normal stress due to axial load. Definition of Linear, Stress-strain diagram. Hooke's Law for uniaxial stress, Possion's ratio, Shear stress and shear strain, Emending stresses, allowable stress and factor of safety, Bending of beams, Bending moment and shear force diagrams, normal stress distribution from bending, Moment of inertia, elastic torsion of circular shaft. Shear stresses and angle of twist.

ENG 211: **Basic Fluid Mechanics (2,0,0) 2 Units**

Fluid Fundamentals: Definition, units and dimensions, density specific volume, specific weight and specific gravity, viscosity, bulk modulus of elasticity, surface tension. Fluid Dynamics (Ideal Fluid Flow): Flow types, streamlines, and steam tubes, continuity equation, Euler's equation, Bernoulli's equation, fluid power momentum equation and applications.

ENG 221: Basic Electrical Engineering I (2,1,0) 3 Units

The electric field of charge, electric conduction. The magnetic field of current, lumped circuit elements, resistance, capacitance, inductance and their terminal characteristic.

Network theorems; Kirchoff s law, superposition, the venin's Norton's and reciprocity theorems, Delta/star transformations.

AC circuit: active, reactive and apparent power, power factor, reactive and active loads and sources, solving single phase circuit using j - operator and the concept of apparent power, solving 3 phase balanced and unbalanced loads.

Magnetic circuit: Magneto motive force, magnetic field strength, permeability, B - H curves of materials, solving magnetic circuits.

ENG 222: Basic Electrical Engineering I (2,1,0) 3 Units

Nature of atom the vacuum, (diode, triode, triode, perntriode). Basic concepts of semiconductors charge carriers, effective mass, mobility, conductivity life time and recombination, continuity equation, flow-equations, Hall effect, PN junction, choke; rectification and filtration, bipolar transistors, it's characteristics: CB, CC, CE configurations. The transistor and switching devices (AC - DC toad lines) small signal amplifier.

ENG 223: Computer Architecture (2,1,0) 3 Units

Two state system; converting number system, logic theory; logic operation; Boolean algebra combination and there various realization. Minimization techniques; various codes synchronous and asynchronous sequential logic (adder, counter, decoder, multiplexer, etc.). state assignment, minimization and finite state machine, Realization, fault diagnosis and threshold logic limitation of sequential circuit. Design examples to digital systems. Computer systems: Input/output, interface and peripheral devices such as keyboard. Mouse, disk, network, protocol examples e.g RS232 and electronics. Memory devices, local area and wide area networks, two state systems, converting number system, logic theory, logic operation, Boolean algebra combination and their various realizations.

ENG224: Structured Computer Programming (1,1, 0) 2Units

Top-down, Bottom-up designs, system specifics on flowchart, pseudo-codes, state diagrams, modular designs, and sequence looping and decision mechanism. Sequence control: Flow of control in programming languages in evaluation expansions and executing statements: user defined expressions and statements, simple and compound: sub programming and co-routines as abstractions of expression and statement, exception handling; parameter passing method, closures, continuation; higher order functions.

Programming Paradigms, Alternative programming paradigms (e.g. Quick basic and Visual basic (VB) VERSION 6.0). Programming construction using the object oriented functional and logic paradigms.

ENG 231: **Engineering Drawing I (1,0, 1) 2 Units**

Projections: Review of Isometric, Oblique and axonometric Projections, Auxiliary view for detailing, sectioning. True lengths sizes and shapes.
Standard dimensional conventions: Dimensions and tolerance, charts and graphs, interchangeable units, fits, tolerances and allowance, machine drawing-keys and keyways, screws bearings, coupling, pipe pipe fittings, valves, gears etc. working instruction such as surface finish, welding and machining symbols.

Use of datum or reference points, lines or planes. Dimensional features for holes, tapers, profiles. Electrical/Electronic symbols wiring; connection or breadboard diagrams, schematic diagrams.

ENG 232: Engineering Drawing U (1,0, 1) *2* Units

Structural Drawings: Material representation, i; dimensioning of structural details, welds, rivets, structural steel, wood, concrete, structural detailing, shop drawing and sketches.
Electrical/Electronic Drawings: Electrical drawing symbols, electrical circuit drawing electronic circuits drawing shop detailing for installations.

Assembly Drawings: Freehand sketches with emphasis on realistic scales on economic forms. Assembly and sub-assembly drawings. Use of sections and cross references of details to improve information from drawings. Exercises involving the production details and assembly

drawings from observation and measurement of actual components and machinery. Exercises in layout for them, Energy plants, pipe words showing valves and pumps.

Analog and Digital electronic symbols, printed circuit diagrams, electrical power diagnosis.

ENG 233: Engineering Mechanics I (Statics) (2,0,0) 2 Units

Definition of mass^entre, gravity centre, mass, moment of inertia!. Equilibrium equations for particles and rigid bodies (forces and moments). Potential and kinetic energy. Preservation of energy. Principles of virtual work. Examples on linkages and mechanisms, flexible connections, cams and wsrk, motion, relative motion of links. Nomenclature for gear geometries.

ENG 234: Engineering Mechanics II (Dynamics) (2,0,0) 2 Units

Review of vectors, components of vectors in one two three dimensional coordinate systems. Time-dependence definition of displacement, velocity and acceleration. Definition of forces and moments Newton's classical laws of motion, impulse and momentum. Kinematics of particles
and rigid bodies in linear and curvilinear motion.

ENG 235: Engineering Thermodynamics (2,0,0) 2 Units

Definition or terms and general concepts of systems, surrounding process, temperature, heat, work and energy. First law of thermodynamics, application to heat engines. Entropy and the second law, combined first and second laws. Idea gases Joule-Thompson co-efficient. Equilibrium processes, Mazwell's relations. Two phase systems. Thermodynamic functions of solution P.V.T. relationship, Work from heat, heat pump refrigeration.

ENG 261: Workshop Technology I (0,0,6) 2 Units

Laboratory and workshop basic hours. Safety rules and regulations. Sources of accidents and prevention, safety gears, safe working environment/condition, ergonomics, laboratory and workshop layouts, working procedures, fire fighting equipment and operations, lighting and signs etc. Electrical trades (Power, Electronics, and Telecommunication). Civil trades (Building, Construction, Roads, Dams, Hydraulics, sanitation, etc).

Bench work: 9 Hours

Introduction to workshop tools. Use and care of hand tools, measuring instruments and their uses and equipments, bench fittings, practical project.

Woodwork Shop: 9Hours

Wood work machine and working principles, operation of machines. Simple wood work project for fitting and joining.

Machine Shop: 18 Hours

Introduction to machine tools, their general characteristics. Simple operations of turning, drilling, grinding, milling, threading, horning, buffing, reaming, introduction to turret lathes, milling machine (horizontal, vertical and universal), Grinding machine - surface grinder, internal grinding machine, external grinding machine, universal grinding machine, shaping machine, simple practical project.

Fabrication Workshop: 9 Hours

Introduction to Fabrication machines, rolling, bending, ribbing, notching, shearing, etc. operation of machines. Simple project on metal fabrication.

Electrical wiring:

Electrical-wiring system: domestic and industrial setup.

ENG 262: Workshop Technology II (0,0,6) 2 Units

Machining: 24 Hours

More advanced work in turning, drilling, and milling operations. Use of shaping machines, presses, fly press, hydraulic press. Introduction to jigs and fixtures for mass production of components.

Fabrication: 18 Hours

Introduction to metal joining technique, bolting, riveting and welding (arc and gas). Welding machine and equipment: Arc welding (MIG, MAG and TIG). Gas welding and cutting chemical bonding.

Safety Features:

Production inspection techniques (destructive and non destructive); tensile testing, fatigue testing, crush testing, drop testing, Ultrasonic testing, x-ray, testing, magnetic particle testing, dye testing, optical scanning test.

Electrical wiring:

Electrical wiring system: domestic and industrial set up Civil Engineering Laboratories

3 Civil Engineering Laboratories . .
Electrical/Electronic Laboratories

3 Electrical/Electronic basic laboratory work Mechanical Engineering Laboratories 3 Mechanical basic laboratory work

ENG 281: Engineering Mathematics II (2,1,0) 3 Units

Limits continuity, differentiation and integration. Approximate methods, Introduction of differential equation. Vector algebra and differentiation. Matrices, transformations, determinants, Introduction to digital computer programming.

ENG 282: Engineering Mathematics II (2,1,0) 3 Units

Vector theory: elementary vector algebra; differentiation of vectors. Vector and scalar field function ns, Gradient. Divergence, curl and directional derivatives, orthogonal curvilinear coordinate lines. Surface and volume integrals. Divergence theorem, Green's theorem an stock's theorem. Elementary tensor calculus.

Complex Analysis: The algebra and geometry of complex numbers, De-Moiver's theorem: transcendental functions, the other root of unity and of a general complex numbers. Functions of a complex variable and some of their elementary properties. Integral Transforms, Fourier and Laplace transforms with their applications,

ENG 284: Engineers In **Society (2,0,0) 2 Units**

Introduction to the Engineering Industry: The development of sciences, inventions and technology. Historical background of the Industrial Revolution and its effects on manufacturing methods, trends, education, population, living standard. Establishments and Institutions, Evolution of the Industrial society, the coalescence of industrial groups, growth of new technologies. Development, growth and effects of technology on society, concepts of society, science, engineering and technology. The historical development of modern society from the early days through industrial revolution to the present. Engineer's Heritage. Impact of technological advances, materials and manufacture, power and fuels, transportation and communication, etc. A review of the Nigerian situation. Structure of the engineering industry: Engineering activities, scientific research plus education, systems operation, consultation. Design and manufacturing, divisions of the engineering industry and sub-divisions of the major disciplines (Electrical, Civil, Mechanical, Chemical, Metallurgical, Production, Aeronautical etc).

Role and responsibilities of the Engineer in Society. Community responsibilities of the engineer social, moral and legal responsibilities, giving evidence before public committees, courts of law, and arbitration panels. National Development Plans of Nigeria. Outline of proposals, targets strategies. The role of the engineer in National Development and National Defences.

Education and Training of Engineers. The development of technological education. Technical education systems; direct and sandwich courses. Qualities of an Engineer contents of an Engineering education. Industrial Training and pupilage. Comparative study of education and training of engineers. Case studies for Britain, Germany, Japan and United State of America. Continuing education.

Professional status of the Engineer. What is a profession? Public obligations. The professional bodies and engineering societies aims and objectives, structure and functions. The Professional Institutions - in Nigeria, COREN, NSE, in the UK, the CEI (ICE, IMech,E) and comparable state and Federal Professional Organisations in the US and other countries. The role of the professional bodies in maintaining professional discipline, ethics and standards. Management of Engineering Associations.

The practice of Engineering, Code of Ethics. The Engineer and Collective Bargaining. The regulation of engineering practice, Council for the Regulation of Engineering in Nigeria (COREN) aims, functions and structure. Effect of Engineering Activities on Society, Impact of technology on business organisations Automation and business organisations. Environmental Impacts Control Governmental interventions. Health and safety.

The engineering industry as an economic resource bases. Peculiarities in the socio-economic relations of the major Engineering Industries and their technological bases. Strategies for strengthening Technological Bases: Support for procurement, research and development; institutional ^building; popularization of science and technology, indigenisation of science and technology. Transfer, adaptation, development and diffusion of technology.

ENG 290: SWEP 2

4 weeks of workshop practice

ENG341: Computer Programming and Applications (1,0,3) 2 Units

Introduction to programme development: User interface problems, solver structure, canonical forms of programs, program correctness, program development by stepwise refinement, recursive program analysis, object oriented concept. Object oriented program development.
Introduction to C programming: programming paradigms; procedure abstraction data abstraction object orientation.

Essential of a C ++ program: Types operators and expressive i.e. variables definition, qualifying compound assignment operators, the increment and decrement operators. Sample input and output: Access to the standard C++ a library, unformatted input/output flow of control relational operators and expression equality, logical operators and expression. The while, for, do statement program files. Arrays and pointers. Introduction to Java programming, JavaScript.

ENG342: Advanced Computer Applications (1,0,3*)* 2 Units

CAD/CAM systems: Introduction, Basic concepts and terminology. Introduction to computer graphic and data base design. Software systems: Interactive languages and data base design for CAD/CAM systems. Description of existing CAD/CAM systems. Application to mechanical, electronic design etc. CAD simulation tools. Manufacturing processes, review of common manufacturing process and the organisation of the manufacturing unit, manufacturing processes aided by computers, numerical controlled machine tool. Computerized numerical controlled tools and adaptive control system. Industrial robots and flexible manufacturing systems (FMS) (PLC, Ladder diagram etc).

ENG 381: Engineering Mathematics III (2, 1, 0) 3 Units

Calculus of several values, limits, continuity, partial derivatives: total differential of a function, Higher order partial and total derivatives differentiation of composite functions, directional derivatives and gradient of a function, integration of total differentials with applications to mechanics. Taylor series, the extremum of function of several variables, line integral with applications.

ENG 382: Engineering Mathematics IV (2, 1, 0) 3 Units

Engineering Statistics: Some aspects of probability theory: Random Events, Frequency Analysis, Data Reduction Techniques, Random Variables. Distribution and Density Functions, Expectation and other moments.

Discrete Distributions. Binomial, Poisson, Multinomial Distributions, Continuous Distributions, Normal, Chi-square, T-F and Gamma Distributions.

Sampling Theory, estimation of population parameters and statistical tests. Regression analysis and analysis of variance.

Operational Methods 1: The Laplace transform and application (excluding the use of the inversion integral and the convolution theorem). Fourier series.

Operational Methods II: Integral transform theory. The Fourier transform. The Laplace transform including the convolution theorem and the Bromwich integral. Application to circuit theory and the solution of ordinary and partial differential equations.

ENG 383: Industrial and Project Management (2, 0, 0) 2 units

Management Science: introduction to operational analysis. Critical path analysis (C.P.A). Optimization. Linear programming, graphical solution of the two-variable problem. Industrial applications i.e. replacement problems.

Queues: The queuing situation in industry; Queuing theory descriptive and graphic treatment, Application of simulation methods in queuing H and simulation, sampling from distributions random numbers, computer simulation, flowcharting and programming models.

Accounting and Financing: Elementary ratio analysis, elements of costing, classification of costs and products costing, cost planning and control, financial planning for operations, distribution of over-heads, introduction to standard costs and flexible budgets. Cost reduction programmes. Depreciation accounting, valuation of assets. Introduction to capital project appraisal and finanicial risk analysis. Methods of economic evaluation, selection between alternatives.

Personnel Management: Selection, recruitment and training, job evaluation, merit rating, incentive schemes, industrial committees and joint consultation. Trade Unions and collective bargaining.

Industrial psychology: communications, economics, leadership and team building, motivation and morale. Staff and line functions, shared decision making at all levels.

Products conception, promotion and marketing: The marketing concept, market analysis, pricing policy, products development. Distribution planning, advertising and products promotion.

ENG 384: Engineering Law and Managerial Economics (2,0,0) 2 Units

Law for Engineering Practice: Source of Law, legislation, case-law and custom, distinction between criminal and civil law, organisation of the courts, doctrine and binding precedent. * -*

Formation of contract, contractual capacity, misrepresentation, discharge and remedies, agency sale of goods; conditions and warranties, transfer of property title, risk breaches of contract wrongful injury to third party, apportionment of damages between employer and employee. Industrial accidents; duties of employer to employees and others on industrial premises, as

imposed by case-law e.g. mines and quarries, factories, office, shops, and railway premises (of Nigeria) extent of action arising from such acts. Labour organisation law in Nigeria - Union Membership, closed shop agency shops, sole bargaining agencies.

Contract Procedure: Parties to a contract and their function, contract documents and their purpose, general conditions of contracts specifications, drawing up bills of quantities, forms of tenders, acceptance of tender. Types of contract: fixed-price, cost-plus, semi-contracts. Financial arrangements, board relations, money measurement for interim certificate.

Managerial Economics: Managerial theories of firm behaviours, price competition in various market structure, non-price competitions and quality optimisation. Efficiency and performance evaluation. Demand estimating and forecasting.

Managerial Accounting and Control: Financial goals and objectives. Analysis of cost behaviour standards for manufacturing and non-manufacturing costs. Absorption versus marginal costing. Control of non-manufacturing. Appropriate accounting and control systems for small, medium and large companies including consideration of centralized versus decentralized financial controls transfer, pricing etc. control over capital projects, integrating project financial analysis with corporate strategy.

ENG 481: Engineering Mathematics V (2,1,0) 2 Units

Special functions of Mathematics physics. Second order liner ordinary differential equations, singular points, the method of Frobenius; introduction to special functions of mathematics physics.

Solution of differential equations of the second order by separation of variables. The gamma and beta functions Lengendre polynomials, Bassel function, Hyper geometric functions.

Numerical Methods in Engineering Numerical analysis. Numerical with applications to the solution of ordinary and partial differential equations Interpolation formulae. Finite differences and finite elements. Application, the solution of non-linear equations. System of linear equations. Numerical evaluation of eigenvalues.

ENG 483: Maintenance Management (2,0,0) 2 Units

Maintenance function: Reliability engineering and maintenance machine reliability, significant elements in the concept of reliability; Failure of machines; concept of availability; factors influencing availability, maintenance policies, preventive and corrective maintenance; manufacturer's maintenance recommendations; collection of information; breakdown time distributions; guides to preventive maintenance policy, corrective maintenance guidelines. Maintenance records, maintenance culture.

Maintenance objectives, planning and control; organisation of maintenance resources (labour, spares, equipment, money); maintenance costs; planning of spares stock and inventory control; management techniques in maintenance; Network analysis in maintenance management; Fundamentals of maintenance. Work planning; a concept of condition-based maintenance.

ENG 582: Technology Policy and Planning (2,0,0) 2 Units

Technology in national development, roles of the Federal Ministries of Science and Technology, National planning, Finance and Justice, National Development Plans, National

Science and Technology fund, fiscal measures, Science and Technology Programming. Planning and execution programme monitoring, evaluation and review, input from professional bodies such as engineering, environmental sciences law, management sciences law, management sciences and accountancy.

Input from the industrial and commercial sector in project planning, design and execution. Input to governmental plans, manpower utilization, national resources, sourcing and utilization. Impact of political stability on technology policy and planning.

ELECTRICAL AND ELECTRONIC ENGINEERING COURSES

EEE 311 Circuit Theory I (2,1,0) 3 Units

Circuit elements and sources, definitions and circuit parameters, electrical units.Network topology: Basic Definition and properties. Network analysis, Mesh current analysis, and Node voltage analysis. Network Theorems. Thevenin's, Norton's theorems, Superposition theorem compensation theorem, Maximum powers transfer theorem, star Delta transformation theorem. The response of RL and RC circuits, introduction. Response of single elements, step and impulse response of RC circuits. The response of RLC circuit. Introduction, the second order differential equations, impulse and step responses of RL and LC circuits. Impulse and step responses of the RLC Circuit. Transform methods in network analysis, introduction to the Laplace transform: Properties of Laplace transform. Application of Laplace transform to circuit analysis, exponential and sinusoidal responses. Two-port Analysis, impedance converted, generalized impedance converter, negative impedance converter, impedance inverter, the gyrator. Introduction Z parameters, Y parameters, in parameters, ABCD parameters. Analysis of ladder network.

EEE 312 : Measurement and Instrumentation (2, 0, 0) 2 Units

Operational principles and dynamic analysis of measuring instruments: moving coil instruments, moving, project planning, design and execution. input to governmental plans, manpower utilization, national resources, sourcing and utilization. Impact of political stability on technology policy and planning.

EEE 314: Circuit Theory II (2,1,0) 3 Units

Filters: Design and operations; low, high, bandpass, butterworth, chebychev filters. Active network: synthesis and analysis.Computer aided analysis / design of electric network, component / service modeling in (Qbasic, Spice/ Pspice and Multism).

EEE 321: Semiconductor Devices (2,1 ,0) 3 Units

PN junction: Junction diodes and their static and dynamic properties at high frequencies, metal semi conductor junction; energy band diagram, schottky barrier, schottky diode, applications of schottky barrier diodes, heterojunctions. Solar cell and light emitting diode. Photovoltaic effects, schottky barrier and MIS solar cells, LEDs, eye sensitivity and brightness, quantum efficiency. MOS Devices, MOS capacitor, MOS transistor (DC characteristic depletion - MOST

and JFET). Polysilicon gate technology, metal gate technology, comparison. Control of threshold voltage through iron implantation, frequency and small signal properties of MOST special, MOS devices (CMOS, VMOS, DMOS, CCD). Examples of CCD in electron - optical applications and signal processing.

Bipolar junction devices: The BJT transistor action; Ebers - molls model, hydrid-pi and h - equivalent circuit, the BJT as a switch, breakdown voltages, lateral PNP transistor, PNPN devices, Noise source in BJT.

EEE 322: Electronics Circuits (2,0,0) 2 Units

Bipolar junction transistor: analysis and design: quiescent iterating point, a.c. load line, wattage dissipation, bias stabilization, the hybrid equivalent circuit. Transistor in dc and ac circuit, input and output impedance's. Coupling, decoupling, the emitter follower; small and large signal amplifiers, differentia! input, distortion in amplifiers, operational amplifiers, virtual earth concept. The field effect transistor, characteristics, equivalent circuit, input and output impedance. Bipolar/FET differences.

Diodes: Types and characteristics, uses, rectifiers and detectors uses as current and voltage sources, analysis, diodes/rectifiers, transistors, and power supplies stabilization.

EEE 331: Electromagnetism (2,1, 0) 2 Units

Electrostatics: Electric charge, coulomb's law, the electric field, the electrostatics potential, the relationship between the electric field and potential, electrostatic energy including capacitance and energy stored in capacitor, technology, metal gate technology, comparison. Control of threshold voltage through iron implantation, frequency and small signal properties of MOST special, MOS devices (CMOS, VMOS, DMOS, CCD). Examples of CCD in electron - optical applications and signal processing.

Bipolar junction devices: The BJT transistor action; Ebers - molls model, hydrid-pi and h - equivalent circuit, the BJT as a switch, breakdown voltages, lateral PNP transistor, PNPN devices, Noise source in BJT.

EEE 351: Electrical Machine 1 (2,1,0) 3 Units

Electromechanical energy conversion principles: Components, law of conservation of energy in differential form, singly, excited and multiple excited magnetic systems, singly existed electric field systems. State functions, variables and co-energy filed and mechanical force
Transformer: Primary and secondary windings HV and LV windings, derivation of e.m.f induced in a winding; equivalent circuit of 1 phase transformer, voltage regulation and transformer taps, equivalent circuit parameters calculation. Transformer efficiencies and rating. 3-phase transformer: types of connection, vector groups parallel operation, harmonics and in-rush currents. Open delta connection and star connection of transformers; instrument transformers, transformer cooling and testing.

DC machines: Stator and rotor construction, rotor windings commutation, solution of problems of commutation, armature reaction e.m.f regulation, effect of armature reaction, starters and protection system; speed control, ward Leonard system.

EEE 352 Electrical Machine 11 (2,1,0) 3 Units

Commutator machines: Commutator action. Armature reaction compensating windings, interpole. Cross-field machine: operating principle, compensated cross-field machine, steady state characteristic. Generalized machine theory circuit model of machine. Convention Primitive machine: circuit equations, torque equation. Invariance of power. Active transformation, passive transformation. Transformation of synchronous, D.C. Cross-field and induction machines to primitive machines. Transient analysis of DC and induction machines. Reluctance motors, hysteresis motors, faults on machines, and methods of starting and protection of machines.

EEE 361: Electrical and Electronic Laboratory I (0, 0, 2) 2 Units

Experiments are based on the courses taken during the semester. The courses include EEE 351 and EEE 321.

EEE 362 Electrical and Electronic Laboratory II (0, 0,2) 2 Units

Experiments are based on the courses taken during the semester. The courses include EEE 352, EEE 312 and EEE 322.

EEE 372: Entrepreneurship Studies (1, 0 ,1) 2 Units

Students can pick either of the under listed:

Domestic wiring
Electrical plans: developing electrical plans

Electrical tools and safety, wiring systems, making electrical connections, earthing, protection, security alarm and telephone wiring.
Inspection and testing, testing instruments. Fault finding techniques.
TV/Radio repairs

Basic principles of TV and Radio, elements of TV and Radio circuits and Applications of TV and Radio. Troubleshooting techniques, test instruments, voltage measurements, oscilloscope measurements. Review of various ICs used in TV and Radio. Transistor troubles. Refrigeration and Air-conditioning (this is handled by the mechanical department)

EEE 401: Electrical Engineering Materials (2, 0, 0) 2 Units

Purpose of classification, properties of gaseous, liquid and solid states. Physical mechanical and chemical properties of dielectric. Liquid dielectrics- petroleum insulating oils. Solid electrical insulating material -classifications, mica as a dielectric. Characteristics of ceramics insulation, HV and LV ceramics, glass, conducting materials, contacts cable wires and electrical carbon
materials.

Semiconductors: materials and application. Magnetic materials - basic concepts, ferromagnetic materials and application, ferromagnetism, materials, electromagnetic wave propagation in ferrites. Application of ferrites.

EEE 421: Advanced Electronics I (2,0,0) 2 Units

Large signal (power) amplifiers (class A, B, AB, C etc) differential amplifiers and current sources. The ideal Op-Amp, the practical op-amps. Op-Amp selection, application to instrumentation and telecommunication. Feedback and stability. Quasi-linear circuit: feedback limiters, comparators and Schmitt trigger. Analog multiplier and modulator. Voltage Regulator, application to power supplies. Phase locked -loop (PLL) circuits. 1C, oscillators and timers: frequency to voltage, voltage to frequency converters.
Dynamic logic systems and RAM memory circuit.

EEE 431: Communication Principles (2, 1,0) 2 Units

Introduction, signals and system, properties of systems, block diagram of communication system analysis, fourier series and its application, fourier transform and application, convolution and correlation filters, sampling theory, examples and problems, linear modulation, introduction: Essence of modulation, advantages and disadvantages, types of modulation (AM, FM and PM), double - side modulation with transmitter carrier (DSB -TC), Double side modulation with suppressed carrier (DSB-SC) single sided band modulation (SSB- SC), demodulation of DSB - TC, DSB - SB and SSB-SC, frequency division multiplexing system (FDM), example and problems, angle (exponential) modulation, phase and frequency relations, concepts of angle modulation, generation of FM and PM waves demodulation of FM and PM waves, FM receivers, applications of FM and PM systems. Examples and problems: pulse amplitude modulation. Time Division multiplexing (TDM), pulse position modulation. Pulse width modulation, application, example and problems. Introduction to digital communication systems. Pulse code modulation (PCM), basic PCM encoding and quantization. TDM of PCM signals, RF digital modulation systems, introduction to data communication, information and signaling rates, application, examples and problems.

EEE 441: Control Theory 1 (2,1,0) 3 Units

Laplace transforms, mathematical modeling of physical processes, transfer functions, signal flow diagrams, block diagram manipulation, step, impulse and frequency response of linear systems. Bode plots, Nyquist plots, root locus, Nichol's Chart and their application to design of compensators. Feedback, feed forward and tacho feedback compensation, PID control, identification of linear systems, stability of linear systems.

EEE 443: Microprocessing Interfacing and Application (2,1,0) 3 Units

Microprocessor system: Basic concept and terminology. Input, output, interface, memory, ALU, Register, program counter, stack pointer etc.

Types of microprocessor: 4 bits, 8bits and 16 bits families, Intel, Motorola, and Zilog, 8088/8086 Microprocessor: introduction to structure and architectures, Pin out configuration and Pin functions. 8088/8086 instruction set addressing modes, instruction types, stack operation, subroutines, timing loops and frequency generation, interrupts and interrupt handling, BCD arithmetic. Assembly language programming. 8255, 8284 and 8279: Their basic structure and

mode of operation for serial/parallel I/O and handshaking. Review of dedicated microcontrollers and applications

EEE 451: Electric Power Principles (2, 1 ,0) 3 Units

Power station: types, steam /thermal and hydro stations. Energy conversion, sequence and cooling techniques (direct, dry and wet cooling tower methods). Detailed treatment and comparison of oil fired, and Coal fired, and nuclear fired power station. Hydro station conventional and pumped storage schemes. Water turbines: Siting consideration for power station. Qualitative treatment of power station, auxiliaries. Overhead iine: Mechanical design; determination of right of way, tower/pole spotting, wood pole steel tower configuration sag, tension, equivalent span, vibration due to wind loading, electrical design: Voltage selection, line power rating, selection and arrangement of ground wires. Determination of line clearances, spacing and tower footing resistance, use of arching rings, size number and spacing of insulators, performance characteristic. Insulators: types of insulators, flashover characteristics of insulators electric stress corona and corona loss. Cables: type and construction, electrical street, thermal characteristics, charging currents, sheath currents, cost factors compared to over head lines. Cable fault localization system earthing: principles of system earthing, component earthing substation earthing scheme, sizing and time rating of neutral dances, determination of earth resistance. Substation: element of a substation, substation layout and operation, busbar and switching arrangements location, appearance and surrounding, voltage regulation equipment, determination if rating and use of application curve area load density and load diversity. Economic viewpoint. Economic operation of power system: Unit input and output curves heat rate characteristics or average generation cost, unit commitment, incremental lost, load scheduling, merit table and penalty factor. Load curves and load forecasting: characteristics, components and uses of load curves. Forecasting techniques. Weather weighting, regression analysis, spectral expansion and pattern recognition, qualitative treatment and comparison.

EEE 461: Electronic Engineering Laboratory III (0, 0, 2) 2 Units

Experiments are based on the courses taken during the semester

EEE 511: Advanced Circuit Techniques (2, 0, 0) 2 Units

Analysis and design of integrated operational amplifiers and advanced circuits such as wideband amplifiers, instrumentation amplifiers, multiplier circuits, voltage controlled oscillators, and phase locked loops. Design techniques for advanced analog circuits containing transistors and operational amplifiers. Simulation of circuit using appropriate packages e.g. electronic workbench

EEE 513: Electronic Instrumentation (2, 1, 0) 3 Units

Introduction to the design of electronics equipment, specifications; including environmental factors such as vibration, humidity and temperature. Tolerance and safety measures, reliability and testing. Duplicating of least reliable part (standby) Ergonomics, aesthetic and

economics. Miniature and micro miniature construction using printed circuit and integrated circuits maintainability.

Computer design methods: Basic electrical and electronic measuring techniques, electric transducer; industrial transducers and measurement systems. Opto-electronic and related system. Digital electronic measuring systems. Data logging; A to D and D to A conversion types and application. Sensing element: potentiometer sensor, resistance strain gauge, capacitance sensor, and inductance sensor, variable reluctance sensor.

EEE 521: Power Electronics and Drives (2,1 ,0) 3 Units

Switching characteristics of diodes, Thyristors and power transistors.
Analysis of diode circuits with reactive loads, analysis of circuits using transistors as switches, Switching transformers, power semiconductor device protection, AC: Line-Commutated converters: rectification, inversion, commutation, A.C characteristic, cyclo-converter, AC and DC chopper: forced commutation. Bridge, parallel and series inverters.

EEE 522: Advanced Electronics II (2,1**,0) 3 Units**

Operational amplifiers and application circuits, analog multipliers, logarithmic and antiiogarithmic amplifiers, oscillators and gyrators.
Analog/Digital /interface D/A characteristic: transfer function, resolution, absolute error, linearity error, differential linearity error power supply sensitivity glitch area settling time, stewing rate, D/A design resistive ladder and R-2R, sample and hold (S/H) amplifier circuit and characteristic, A/D characteristic; transfer function resolution error, power supply sensitivity; comparator with hysteresis, output versus input; A/D designs and comparison of properties tracking dual industrial transducers and measurement systems. Opto-electronic and related system. Digital electronic measuring systems. Data logging; A to D and D to A conversion types and application. Sensing element: potentiometer sensor, resistance strain gauge, capacitance sensor, and inductance sensor, variable reluctance sensor.

EEE 523: Solid State Electronics 2 Units

Physics and property of semiconductors including high field effects, carrier injection and semiconductor surface phenomena, devices technology, bulk and epitaxial material growth and impurity control, metal-semiconductor interface properties, stability and methods of characterization: controlled and surface controlled devices.

EEE 526: Industrial Electronic Design (2,1, 0) 3 Units

Characteristics and industrial applications of Thyristors and other SCR devices. Transducers and their applications in sensing light, voltage, pressure, motion, current, temperature, e.t.c. Mechanical relays, solid-state relays and remote control concepts in instrumentation. Microprocessor and Microcomputer-based systems.

EEE 531: Telecommunication Engineering (2,1,0) 3 Units

Cable telegraphy and Telephony; characteristics, cross talk, equalization, polelines, aerials and underground cables, telegraph system; codes radio system; terminal equipment (teleprinter, relay switching systems, repeater). Telephone receiver, switching (stronger cross bar, electronic switches). PBX, PABS, transmission standard; telephone network structures.Cellular system; the cellular structure; cell types; characteristics and there differences.
Overview of the GSM (Global System for Mobile Communication) architecture.

EEE 534 : Introduction to Digital Communications (2,1,0) 3 Units

Block diagram of digital communication system, sampling theorem, Shannon theorem and applications in digital communication system. Advantages of digital signals. Noise in digital systems, filtering and equalization. Digital Radio; PSK, QAM. Bandwidth efficiency, probability of error and bit error rates. Data communication and protocols. Digital transmission: PCM, Delta modulation PCM, adaptive delta PCM pulse transmission. Applications of digital communication system: satellite communication, telephoning, microwave, wireless communication, broadband communication and Internet technology. Fiber optics communications.

EEE 536: Communications System Engineering (2,0, 0) 2 Units

Television systems: Basic television principles, monochrome television transmission, sequential scanning and interlace scanning techniques. Color Television transmission and Reception; Color coding Color camera, luminance and chrominance signal,
Anatomy of television channel; comparison between video formats, NTSC, PAL and SECAM. Satellite communication system: satellite orbit, frequency and propagation considerations. Satellite communication link Design; (VSAT link design).

Satellite earth stations, international regulation, technical constraints, and general configuration. A survey of microwave engineering: models in wave-guides and regulator; passive components, reactive and resistive element, directional compilers.

Antennas: basic antenna operation, radiation mechanism and radiation patterns. Antenna loading, top and loading coils. Yagi-Uda antenna, loop antenna etc. A survey of microwave engineering: Models in waveguides and resonators, passive component, reactive and resistive elements, directional couplers and tees ferrites, isolators and circulators.
Principles of radar systems.

EEE 537: Introduction To Digital Signal Processing (2,0,0) 2 Units

Basis concept and terminology in DSP, comparison between analog and digital signal processing tools and techniques for DSD:
Description of discrete signals and systems in time domain, description of discrete signals and system in frequency domain, discrete Fourier transform (DFT) and inverse transform properties, circuit convolution and its relation to DFT fast Fourier transform (FFT): spectral density function, normalize energy.

Filters: filter realization, method for the realization of a transfer function. Filter with finite impulse response and linear phase. Filter design of infinite impulse response (1IR) digital filters

from analog filter, computer-Aided design of IIR digital filter, properties of FIR. Design of FIR filters using windows, computer-Aided design of FIR filter. Comparison of I IF and FIR digital filter. Statistics methods for filtering principle: Random frequency auto correlation function, power spectrum quadratic optimization.

Introduction to Kalman Filter, wiener filter adaptive algorithms. Signal detection in noisy environment Mini computers, microprocessors, programmable signal processors. Matrix processors, special Ics, spectrum analyzer, AD/DA converters. Areas of application of DSP.
Image and voice processing. Telecommunication, industrial, radar and sonar, biomedica! analysis.

EEE 538: Telecommunications Services Design (2, 0,0) 2 Units

Telephone installations, PABX installations, choice of cables and accessories. Computer networking: choice of cables, installations, accessories, optic fiber installations and accessories. Lighting protection techniques. Earthing techniques. Bill of engineering materials, evaluation, and billing of telecommunication installations.

EEE 541: Computer Engineering I (2,1,0) 3 Units

Communication within computer systems; addressing and databases. CPU-memory, I/O device communications. Communications between systems: host/host versus host/slave relationships, handshaking protocols and synchronization. Serial versus parallel communications. Hardware elements of network design- terminals, modems, multiplexers, and concentrators. Message and control processors. Communication equipment and carriers. Software elements of computer networks: host operating systems. General structure of data network architectures, emergency theorem. Topological design, protocols routing, congestion, control, communication satellite, local area network. Random access techniques.
Error detection and correction codes.

EEE 542: Computer Engineering Ii (2,1,0) 3 Units

Boolean operations and circuits, gate networks, design example of gate networks. Circuit Parameters'. Fan in, fan out, noise immunity and generation circuits' topology, speed / power, basic computer circuit design: cages, flip-flops, registers, counters etc. Integrated circuit TTL, ELL, MOS etc, operational characteristics, applications, special circuit, Timing, delays, interfacing equipment, computer systems; examples, computer types, coding schemes for digital data transmission. Introduction to knowledge-based systems (Al and ANN)

EEE 544: Control System Engineering (2, 0 ,0) 2 Units

State space description of linear systems, concepts of controllability and observability: state feedback, modal control observers, realization of systems having specified transfer function, applications to circuit synthesis and signal processing. An introduction to Robot static's and dynamics. Mobile robot task, planning and programming. Accuracy and repeatability. Sensors, Actuators, and Control: internal and external sensors. Computer interfaces. Actuator and drives, vision systems in robotics. Robot control and programming computing. Robot applications: Automated assembly. Robot work cell design safety.

EEE 545: Analog and Digital Computers (2,0,0) 2 Units

Analog computation, electrical analog of mechanical, electromechanical systems and servomechanisms. Analog computer elements: potentiometers, operational amplifiers, function generators, and simulation of system transfer functions.
Digital computer structure and elements, CPU, storage, peripherals arithmetic processes, Hybrid computer systems.

EEE 546: Advanced Computer Programming (2,0,0) 2 Units

Elements statistics: distribution and experiments: Law of large numbers.
Numerical iteration procedures, revision of FORTAN and BASIC in engineering. Application program in computer-aided design of electrical and electronic systems.

EEE 551: Electrical Power System Engineering 1(2,1,0) 2 Units

Three phase systems, modeling of power elements, load flow studies, gauss Seidel and Newton-Raphson load flow Iterative methods. Symmetrical components; fault studies. Analysis of balanced and unbalanced faults, stability studies steady state stability, and transient stability.

EEE 552: Electrical Power, System Engineering 11 (2,0,0) 2 Units

Power system protection, salient Pole alternator analysis, dynamics of salient pole alternator, over voltage and insulation co-ordination. The controllability of electric power systems. Influence of controllability and the possible solution of the control problem. Control of equilibrium points. State optimization. Frequency and load control voltage and reactive power control. Hierarchical control in power system. The effect of voltage regulator on rotor and damping. The role of the human operator. Optional control of power systems.

EEE 553: Electric Drives (2,0,0) 2 Units

Types of motors, Shunt, Series, compound wound DC,AC induction motors, repulsion, reluctance, hysteresis, synchronous motors. Speed-torque characteristics, speed control of electric drives. Breaking Motor power rating selection, protection, control of drive motors. Application of electric drives.

EEE 554: Power System Communication and Control (2,0,0) 2 Units

Review of transmission line theory. High frequency communication on power lines. Carrier systems and power lines; carriers applications. Multiplexing, Telemetering, signal processing and data transmission, control of power generation, voltage control, system stability. Automatic voltage regulators, regulating transformers.

EEE 555: Power Systems Planning & Optimization (2, 0, 0) 2 Units

Brief review of optimization theory including constrained and unconstrained minimization, linear programming and dynamic programming. Application to the power dispatch problems, generating planning and transmission planning, load forecasting techniques. Use of capacity outage tables.

Generation; Transmission and Distribution system, expansion, maintenance planning and scheduling. Industrial power system planning and layout to include power panel arrangement and specifications. Energy conservation in building.

EEE 556: Electrical Energy Dynamics *(2,* 0 ,0) 2 Units

Basic operation of rotating machines. Transformer connection and generation of three-phase transformer. Polyphase circuit; under-balance and balanced condition Analysis of Polyphase induction motors, equivalent circuits, characteristics of testing, steady state analysis and operation of synchronous machines, system faults.

Dynamic operation of electrical machine short circuit analysis of machines system faults, parallel operation of synchronous machine. Analysis of cross-field DC machine. Closed loop control DC and AC motors (voltage and speed control transient analysis) synchronizing phenomena and sustained oscillations in synchronous machines. Application aspect of motor; correction time, losses, rating and general consideration of motor selection. Electromechanical energy transfer in static and dynamic electrical and magnetic system.

EEE 557: Power System Protection (2,0,0) 2 Units

Generation and measurement of high voltage and current. Switchgear: Arc phenomena, arc control, DC and AC interruption, recovery voltage, transient, types of circuit breakers, applications and limitations, rating and testing. Protection: current and voltage transformer principles of relaying, electromagnetic relays and solid-state electronic equipment: pilot circuit. Application to over current, differential and distance (impedance) relaying. Characteristic of fuses, selection and application of fuses, brief description of recovers and their application. Brief treatment of protection devices, co-ordination, using time current characteristic.

Principle of surge protection: lighting arrestors. Arching rings: arrangement of protection devices. Selection of arrestors, rating and co-ordination with apparatus insulation LV protection equipment and systems including methods of motor over load and short circuit protection. Special protection measures in the design of power electronic interface, equipment protection of building electrical service. Use of MCBS and fuses, extended to protection of appliances. Advances towards computer based monitoring and protection of industrial and utility protection systems.

EEE 558: Electromechanical Devices Design (2,0 ,0) 2 Units

Design of transformers, types of transformers, principles of AC and DC Machines design, introduction to parks equations.

EEE 571: Electrical Engineering Project 1 3 Units

Supervised research project by individual student in partial fulfillment of the requirement for graduation.

EEE 572: Electrical Engineering Project II 3 Units

Supervised research project by individual student in partial fulfillment of the requirement for graduation.

EEE 581: Electrical Services Design (2, 0 ,0) 2 Units

Lighting installations, power installation, energy supply and distribution: Regulation- IEE, illumination design. Nature of light, sensitivity of the eye; common terms used in lighting design; laws of illumination; polar cures; lighting schemes. Lighting sources; filament lamps, electric discharge lamps; effect of voltage variation; stutters; efficiency and costs; lighting installation; interior lighting design, floodlighting design and street lighting design, electrical drawing for architectural plans; commonly used electrical and electronic symbols; number of lamps in one circuit and number of lamps controlled by one switch; one and multi position control of lamps; lamps, their switching and circuit connection; radial and ring circuit connection of socket, outlet bathroom requirements for socket outlets and lamps switches and lamp; lighting arresters; telephone installation,

EEE 582: Reliability and Maintainability of System (2, 0 ,0) 2 Units

Introduction to reliability, maintainability, availability. Elementary reliability theory. Application to power systems, electronic components. Test characteristics of electrical components. Fault types. Designing for higher reliability. Packaging, Mounting, Ventilation, protection from Humidity, Dust.