Veritas University, Abuja

Faculty of Engineering

Department of Electronic and Computer Engineering

Handbook

of

Undergraduate Programme

2021 - 2026

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PREFACE

The popular saying that "knowledge is power" finds more visible expressions in Engineering than in any other discipline and profession, given the categorization of the world into first (1st), second (2nd), and third (3rd) world countries, according to their levels of Engineering and Technological development. As university education in Engineering has a significant role in the acquisition of the necessary (engineering and technological) knowledge to maintain the status quo (their superior capabilities and competitiveness), the developed (1st and 2nd world) nations have been attaching much importance to this sector. This is no exception in Nigeria, which has prepared a timetable to become a developed (1st or 2nd world) nation by the year 2050, and already launched a strategy for this. Thus, for quite some time, Nigeria has been laying much emphasis on Engineering disciplines at the Universities and these (disciplines) have been expanding at a remarkable pace. As a result, having the Faculty of Engineering offering a variety of Engineering disciplines in many universities has become common in Nigeria, and this has enabled the country to provide better access to the youth for higher education in Engineering. However, this proliferation of Faculties and disciplines in Engineering has not been matched with the high quality of education and creative technical knowledge and skills expected of Engineering graduates. It is now a matter of concern that the Engineering Curriculum in the Nigerian University system has not been able to keep pace with the current technological advances on the world scene and a large percentage of Engineering graduates are observed to need further education and training to be effective. Engineering by its nature is a creative profession. However, a situation where an Engineering graduate walks out of a university with an Engineering certificate but with no creative technical/professional knowledge and skills to show for it does not augur well for nation-building and technological development.

Considering this handicap, Veritas University has decided to formulate a Model Scheme of Instruction and Syllabi for Programmes of Study in Engineering designed to produce creative thinking graduate Engineers equipped to walk out of the classroom straight to create things and solve problems in the society. With a five-year strategic plan of scalable development embracing six branches, viz., Electronic Engineering, Electrical Engineering, Computer Engineering, Mechanical Engineering, Civil Engineering and IT, the framing of our Model Scheme/Syllabi was taken up for two programs in Electronic and Computer Engineering in the first instance and the same has been presented in this document. It is hoped that Veritas University would have cause to showcase our Model Scheme of Instruction and Syllabi as Engineering education with a difference in Nigeria.

Engr. Prof. Anthony N. Nzeako
Dean, Faculty of Engineering.

From the Coordinator of the Department

The Department of Electronic and Computer Engineering and by extension, the Faculty of Engineering was established on February 10th, 2020 after a successful Nigeria University Commission (NUC) resource verification exercise of 24th November, 2019. It commenced activity with three (3) academic staff, a faculty officer and two (2) students. The three staff members were Engr. Professor Anthony N. Nzeako (Dean and Head of Department) Dr. (Mrs.) Maria-Assumpta O. Eduok-Akpan, Mr. Anthony Lordson Amana and Ms Lydia Aneato (Faculty Officer). The two students were Ochaju David and one other student who withdrew after registration for first semester to a public University. Three other staff, Dr. Francis Chiedu Uwaechia, Mr. Eric Atanga Taniform (Software Engineer) and Mr. Patrick Oketa (Electronic Technologist) accepted to support the new faculty with their experience, but on parallel appointments.

The conduct of staff and students of the Department is guided by the principle of '**Making the world a better place, the engineering way'** that stresses:

i. Creativity, entrepreneurship, diligence, self-reliance and service.
ii. Accountability, discipline, honesty, integrity and sense of responsibility,
iii. Justice, patience, politeness, self-sacrifice, tolerance and transparency,

Students are thus trained to work in teams, devoid of malice, hatred and rancour whether in the lecture hall, workshop, laboratory or anywhere with the hope of grooming and forming graduates who will go out to create a job of their dream or to a waiting job.

At the commencement of the 2021/2022 academic year, we had an improvement in the academic staff strength as two Senior Lecturers, a Lecturer II and a graduate Assistances were employed. A serving Lecturer II was also promoted to Lecturer I. All as full staff.

This is the maiden edition of the Departmental Handbook. It was compiled to meet the needs of both staff and students in their normal duties of teaching, learning, research, recreation and devotion to God.

May The Good Lord grant us wisdom and knowledge to seek the truth and continue the work of creation.

Anthony Lordson Amana MIET
Coordinator

General Information about the Department

The Department **offers two programmes: Bachelor of Engineering (B. Eng.) in Electronic Engineering** and **Bachelor of Engineering (B. Eng.) in Computer Engineering**. Currently, the Department is at 300 level, with four (4) students for the Computer Engineering Programme. The staff strength is Ten (10) as listed below, comprising of eight (8) academic staff and two (2) in administration, respectively.

S/N	Name of Staff/Designation	Qualifications	Areas of Specialization	Rank	Status	Registration/Membership
1.	Engr. Prof. Anthony N. Nzeako **(Dean)**	M.Sc. PhD.	Control Engineering	Professor	Full Time	COREN/MNSE/IEEE
2.	Anthony Lordson Amana **(Coordinator)**	B.Eng. MBA M.Eng. CISM CISA ITIL	Electronic & Telecommunications, Information Systems & Security	Lecturer I	Full Time	MIET
3.	Engr. Dr. Fidelis I. Onah	B.Sc. M.Sc. PhD	Electronic and Communication	Senior Lecturer	Full Time	COREN/MNSE/SMIEEE
4.	Engr. Dr. Ngang Bassey Ngang	Dip.Edu. B.Eng. M.Eng. PhD.	Power Systems Engineering/Machines	Senior Lecturer	Full Time	COREN/FNSE/MNIEEE
5.	Dr. M.O. Eduok-Akpan	B.Sc. M.Sc. PGD M.Eng. PhD.	Industrial Engineering/ Mathematics	Lecturer I	Full Time	
6.	Dr. Fyali Bukar Jibji	B.Eng. M.Eng. PhD	Power systems Engineering, Renewable Energy	Lecturer II	Full Time	
7.	Ms. Kiyesola Kolawole	B.Eng.	Materials and Metallurgical Engineering	Graduate Assistant	Full Time	
8.	Isaac Ogwu Jibrin	B.Eng.	Electrical/Electronic Engineering	Graduate Assistant	Full Time	
9.	Ms Lydia Ubah Anaeto **(Faculty Officer)**	B.Eng., PGD	Agric. Mechanization	Senior Experimental Officer	Full Time	
10.	Mr. Richard A. Ugbe **(Department Secretary)**	BA	, PGD Philosophy	Admin. Officer1	Full Time	

In the 2021/2022 academic session, the Department has a student strength of one hundred and two (102), distributed as shown in the table: Admission to 100 Level is on-going.

S/N	Level	Electronic Engineering	Computer Engineering
1	300	None	4
2	200	19	79
3	100	8*	73*

** Registration is in progress*

1. Vision, Mission, Philosophy, Aims and Objectives of the Department

1.1 Vision

To be a leading centre of higher learning with academic excellence in the field of Electrical, Electronics, Computer, as well as Telecommunications Engineering.

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1.2 Mission

To impart high quality technical education by offering undergraduate, graduate and research programs in the domain of electronics and communication engineering with thorough foundation in theory, along with strong hands-on design and laboratory components, tools and skills necessary for the students to become successful major contributors to society and the profession

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1.3 Philosophy, Aims and Objectives of the Programmes

Given that Engineering is an applied science for efficient problem solving through design, modeling, simulation, analysis, and fabrication, which in effect translates to the production of key human products in response to the socio-economic and technological challenges of our time, **the Programmes** of the Department are designed to improve the quality of life of not only the immediate environment of the University, but also of Nigeria and the world at large. More specifically, the **Philosophy, Aims and Objectives of the Programmes of the Department are:**

i. To train Engineers who will immediately upon graduation become problem solvers, designers or product Engineers, participate actively in the engineering process, and translate their knowledge into practical and meaningful products
ii. To apply the knowledge of mathematics, science and engineering principles for modeling, analyzing and solving problems in the domain of electronics and communication engineering.
iii. To design and develop practical solutions for real-life problems in the domain of electronics and communication engineering.
iv. identify, formulate and analyze real-life problems in the domain of electronics and communication engineering using appropriate tools and standards
v. To design and develop sophisticated equipment and experimental systems for conducting detailed investigations to solve multifaceted problems in the domain of electronics, communication and computer engineering
vi. To produce electronics, communication and computer engineers capable of identifying global problems faced by the society and proffering solutions.
vii. To maintain lifelong learning process by participating in various professional activities and adapt to rapidly changing technologies.

viii. To demonstrate knowledge and understanding of project management, finance and apply these projects as individual, team member or leader

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2. Modes of Admission and Admission Requirements

Candidates may be admitted into the undergraduate degree programmes of the Department via one of the following modes:

i. Unified Tertiary Matriculation Examination (UTME)
ii. Direct Entry (DE)
iii. Inter-University Transfer

2.1 **Unified Tertiary Matriculation Examination (UTME) Entry Mode**

Admission to a degree programme in the University is through the Joint Admissions and Matriculation Board (JAMB), with a Post-UTME Screening. Candidates must possess at least one of the following in addition to Credits in Mathematics and English:

i. Credit passes in 5 subjects including Chemistry, Physics and other Science subjects in the West African Senior School Certificate Examination (WASSCE) or the National Examination Council (NECO) or the General Certificate Examination (GCE) Ordinary Level or equivalent qualifications
ii. Credit passes in 5 subjects with at least 2 of them at Advanced Level, two of which must be Physics and Mathematics and 3 at Ordinary level with Credit, or equivalent qualifications
iii. GCE, in 5 subjects with at least 3 of them at Advanced Level, two of which must be Physics and Mathematics, and two at Ordinary Level credit, or equivalent qualifications

2.2 **Direct Entry Mode**

Candidates seeking Direct Entry admission to the 200-level of a degree programme in the Department should possess, in addition to the minimum of five credit passes at the WASSCE/NECO/GCE, any one or more of the following:

i. Advanced Level GCE pass in Chemistry, Physics and Mathematics.
ii. Interim Joint Matriculation Board (IJMB) Examination pass in Chemistry, Physics and Mathematics
iii. National Diploma (ND) Distinction in related discipline or Higher National Diploma (HND) Lower Credit in related field
iv. First degree in a related area from a recognized university

Furthermore:

i. The University reserves the right to screen Direct Entry candidates before admission
ii. Results at ‘O’ level and ‘A’ level must be attained at not more than two sittings.

2.3 **Intra-University Transfer**

Intra-university transfer involves the transfer of students from one Faculty or Department to another within the University. The minimum requirement for such transfer is a CGPA of 3.0. All other UTME requirements apply.

2.4 **Inter-University Transfer**

Inter-university transfer involves the transfer of students from other universities to Veritas University. The minimum requirement is a CGPA of 3.0 on a cumulative CGPA of 5.0. Transferred students are to take all lower-level precursors to their core courses. All other UTME requirements apply.
Candidates must obtain and fill the Inter-University Transfer form from the Admissions Office. An application for admission to the University through inter-university transfer will be considered only if the receiving Department is satisfied that the candidate has met the minimum academic requirements for admission to the chosen study programme. All inter-university transfer candidates will normally be admitted into 200 (or lower) level of the receiving programme.

3. **Registration**

3.1 **General**
All new students, on arrival at the University, should proceed for registration by contacting the under listed for the following:

i. Admissions Office for Screen, clearance and admission
ii. Bursary - to pay all necessary accommodation fees
iii. Student Affairs Officer - for hostel
iv. Department - for Departmental registration / documentation and course registration forms and to have them signed
v. Faculty Officer - for Dean Signature of forms
vi. ICT - registration, Matriculation Number and student identity card
vii. University Library - for registration
viii. University Health Centre - for registration and medical examination

3.2 **Course Registration**
At the beginning of every semester, all students are required to follow procedures prescribed by the Examination and Records Unit of the Registry and register manually and online. Student will be guided by their level adviser on the courses to register. A student is not fully registered for an academic session unless the manual and on-line procedures have been completed and submitted at the department within a stipulated period.

Students who attend lectures in courses that they have not registered for shall do so only with the permission of the course lecturer(s). However, such students shall not earn any credit units from participation in such courses.

Furthermore, students who sat for examinations in courses that they have not registered for shall not earn any credit units from participation in such courses.

3.2.1 **Late Course Registration**
Students who fail to register and submit course registration forms within the stipulated registration period, shall pay a late registration fee to be determined by the University.

3.2.2 **Deferment of Admission/Studies**
A candidate offered an admission to the University may defer the admission upon:

i. acceptance of the offer of admission by completing the University acceptance form and online registration
ii. payment of all prescribed fees for the session in which student is admitted
iii. applying to the Registrar in writing for the deferment of admission or studies to a specific academic session

iv. applying in writing to the Registrar for resumption on expiration of the deferment period.

The maximum period for deferment of admission/studies shall be one academic session unless otherwise extended by approval of Senate. A student who fails to return to the University at the expiration of the deferment period shall forfeit the right of admission/studies.

3.2.3 **Further Condition for Voluntary Withdrawal**

Any student who fails to register and attend lectures for one academic session without approval of Senate shall be considered to have voluntarily withdrawn from the programme.

4. **Work Load**

4.1 **Full-time and Residency Requirements**

All undergraduate programmes offered in the Department are full-time and fully residential. Students may not undertake any regular paid employment during the course of the programme.

A student shall normally register for a minimum of thirty (30) and a maximum of forty eight (48) credit units in any academic year, except in the case of direct entry and inter-university transfer. This means that a student should take between 15 and 24 credits in any given semester and no student can earn more than forty-eight (48) credit units at the end of an academic year. In the special case of direct entry and inter-university transfer students, who follow a four-year degree programme, this maximum may be exceeded by the number of credit units assigned to the General Studies courses (GST), Veritas University Theology courses, and Students' Industrial Work Experience Scheme (SIWES) which they must take.

4.2 **Audited Courses**

A student may register to audit a course unit outside his/her programme of study according to his/her interest, subject to Departmental approval. A student may write examinations in such audited courses, and the scores for such examinations reflected in his/her academic records, but he/she may not earn credits for them.

4.3 **Conditions for Probation**

If at the end of the session, a student's Cumulative Grade Point Average (CGPA) is less than 1.50, such student shall be placed on probation for a specified period of one full session. A student on probation should reregister for all the failed courses before registering the current ones. Such student should not exceed a credit load of 15 for that semester. If the student still has a CGPA of less than 1.50 at the end of the session, the student is advised to withdraw from the programme and may shop for admission in another programme in the university.

4.4 **Conditions for Withdrawal**

If at the end of a probation period, a student's CGPA is still less than 1.50, the student will be asked to withdraw from the programme of study. Such student need not leave the University, rather the student may transfer to another programme in any Department within and outside the faculty that may be willing to accept him/her.

5 **The Course Credit System**

Teaching in the Department is by the 'course system'. This is referred to as a "quantitative" system or organization into unit courses which are examinable, and for which students earn credit(s) if passed. The courses are arranged in a progressive order of levels of academic progress, e.g. 100 Level: 101, 102, 103, … 199; 200 Level: 201, 202,

203, …299. The numbering of courses enables students to immediately know those courses offered during the first or the second semester as well as courses taken in various years.

5.1 **Coding System**

Three-digit coding system has been adopted for all courses in the University as follows:

First digit represents the Level of studies
Third is the Semester. Odd – First semester; Even – Second Semester

For the Departmental courses, the courses are identified as follows:

GST – General University Course domiciled in General Studies Directorate
GET – General Engineering Courses
EEE - Electronic Engineering Course
CPE – Computer Engineering Course

For instance, **GET 201** can be identified as the first General Engineering course in the first semester for 200 level students. CPE 301 is the first computer Engineering course in the first semester for 300 level students/

5.2 **Course Classification**

Courses are classified as follows:

i. **Compulsory Courses**: These are the core courses within the discipline that must be taken and passed at a grade of 'D' and above.
ii. **Elective Courses:** These are optional courses within the Department for the purpose of fulfilling the minimum requirements for the award of degree.
iii. **General Studies Courses**: These are University-wide courses that must be offered and passed by every undergraduate student in the University irrespective of discipline. These are General Studies (GST) courses.

6. **Examination**

6.1 **Setting of Questions**

All examinations shall have:

i. First Examiners (normally the Academic Staff Member in charge of the course), and
ii. Second Internal Examiner (a Moderator) as may be approved by the Departmental Board of examiners.

Questions set shall be at the discretion of the examiner(s) subject to the approval of the Departmental Board of Examiners usually consisting of all the academic staff of the Department. However, the numbers questions set and the numbers to be answered is dependent on the course credit load. The standard here is: for three (3) credit load, Six questions to answer four; for two credit load, five questions to answer three. In the case of 500 level examinations, External Examiners shall participate in the moderation of question papers and vetting of answer scripts.

Examiners are expected to submit question papers, marking guide, marked answer booklets and raw scores normally within two weeks after the date of examination.

6.2 **Computation of Examination Results**

6.2.1 **Continuous Assessment**

Every course offered in the Department must have a continuous assessment component, which shall contribute 40 per cent of the total marks for the course unit at the end of the semester. The continuous assessment component consists of term papers, frequent tests, assessment of laboratory assignments, etc. Two continuous assessment tests or intra-semester examinations (having 10 marks each) and two written assignments or term papers and presentations (having 10 marks each) as well as attendance at lectures and tutorials count for continuous assessment grade. Students shall be given their continuous assessment test scripts and marked written assignments with their scores on them as feedback and the same shall be

published before the end-of-semester examinations. ***Any student who has no score for continuous assessment earns an F grade for the course irrespective of his/her examination score***.

6.2.2 **Semester Examination**

Examinations are administered at the end of each course, usually at the end of the semester. The end-of-semester examination shall contribute 60 per cent of the total marks for each course unit and credits shall be earned for course units passed. The Grade Point Average (GPA) will be calculated based on the total number of course units a student had registered for during the semester, whether passed or failed, and reported along with the semester and session results. However, the marks a student scores for any course unit not originally registered for shall be discarded.

6.2.3 **Grade Point Average** (**GPA**)

Grade Point Average (**GPA**) is a measure of the average performance of a student for a given semester expressed in grade points earned in all the course units taken by the student during the semester. GPA is derived from the raw scores obtained in all course units taken, computed by first multiplying the numerical value assigned to the letter grade attained in each course unit (that is, the *value points*) by the number of credit units assigned to that course to obtain the *grade points.* The grade points are summed across the number of courses taken to obtain the *total grade points* earned in that semester.
Finally, the sum - the *total grade points* earned in that semester - is divided by the total credit units the student registered for in the semester to get the grade point average. An illustration of the computation of the GPA is given below.

Table 1: An illustration of GPA Computation

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
Courses Registered	Credit Units	Raw Scores (%)	Letter Grade	Value Points	Grade Points	Remarks
CHM 101	2	67	B	4	8	Grade Points Average (GPA) is derived by dividing the total of Col. 6 by the total of Col. 2, that is, GPA = Total of Grade Points (GP) earned/Total Credit units registered (TC) = 75/21 = 3.57
CHM 107	1	65	B	4	4	
CSC 111	2	78	A	5	10	
GST 111	2	55	C	3	6	
GST 121	2	70	A	5	10	
GST 131	2	46	D	2	4	
GST 141	2	40	F	0	0	
MTH 111	3	64	B	4	12	
PHY 111	2	80	A	5	10	
PHY 121	1	56	C	3	3	
GET 199	2	60	B	4	8	
TOTAL	**21**				**75**	

6.2.4 **Cumulative Grade Point Average** (**CGPA**)

The Cumulative Grade Point Average (CGPA) is a measure of students' overall performance in their programmes of study at the end of a particular semester or academic session. It is an up-to-date average or mean of the cumulative grade points (CGP) earned at any point during the programme of study. The CGPA is derived by adding the *grade points* earned by the

student in each course taken to-date; then, this aggregate quantity (the cumulative grade points) is divided by the sum of the credit units of all the courses taken by the student to-date to obtain CGPA = (cumulative grade points average) - (cumulative credit units).

6.3 **External Examiner System**

At the beginning of each semester, external examiners shall vet the course outlines for each course offered at the 500 level of the programme for which they are responsible. They also vet the questions to be given at the end-of-semester examination as well as the marked scripts for the end-of-semester examinations. External examiners shall also participate in final year project defence and in the determination of overall results/classification of degrees.

7. **Departmental Boards**

i. **Departmental Board of Studies**, shall consists of all course Lecturers and Chief Technologists in the Department. It shall deliberate and make recommendations to the Faculty Board of Studies on all matters relating to Departmental academic programmes

ii. **Departmental Board of Examiners** consisting of all Lecturers of the Department. The Board shall deliberate and make recommendations to the Faculty Board of Examiners on all matters relating to examinations.

iii. The Head of Department chairs the two boards.

8. **Withdrawal and Probation**

i. A student whose CGPA falls below 1.50 at the end of a session shall be placed on a period of probation for one academic session.

ii. At the end of a particular period of probation, if the student still earns a CGPA of less than 1.50, he/she shall be required to withdraw from the programme.

iii. In order to minimize waste of human resources, consideration is normally given to students withdrawn from 200 level of the programme to transfer to other related programmes within the Faculty of Engineering or to any other programmes in other Departments within the University perceived as relevant for the purpose.

9. **Repeating Failed Courses/Excess Credit Units**

Subject to the conditions for withdrawal and probation, a student may be allowed to repeat the courses failed at the next available opportunity provided that the total number of credit units carried over during that session shall not exceed 48. The Grade Points earned in all the attempts in such courses will count towards the CGPA. However, final year students can apply to Senate through their Heads of Department to carry an excess of six (6) Credit Units if that will facilitate their graduation within a given academic session.

10. **Class Attendance**

To be eligible to sit for an examination, a student must have 80% class attendance. A list of registered students in the faculty shall be made available to students present in the lecture/practical/seminar to sign. Lecturers are responsible for collecting the signed attendance sheets and submitting them to the Faculty Officer. Percentage attendance would be collated at the end of the semester by the Department before the examination. Heads of Department must update the attendance of students to advise them accordingly.

10.1 **Absence from Lectures or Examinations**

i. Permission to be away from lectures for whatever reason must be sought in writing from the Head of Department

ii. When a student misses an examination, such student is advised to apply in writing to the Senate through the Head of Department and Dean to be granted an opportunity to take the examination. If the reason for missing such examination is accepted, Senate may approve taking the examination at the next available opportunity.

iii. In case of ill-health, a student shall provide a medical report issued by an authorized medical practitioner and counter-signed by the Medical Director of the Medical Centre of Veritas University, Abuja.

10.2 **Suspension of Studies**

No matriculated student of the university may keep away from studies for any reason without informing the university authority through the Head of Department and the Registrar. The information must be in writing and stating reasons.

11. **Academic Advisers**

Academic advisers are assigned to students in each academic session to counsel them on their academic performances. Students are free to meet with their academic advisers at least once in the semester for counselling especially prior to course registration. Students may also meet the Head of Department who is readily available and accessible to look into their problems.

12 S**enate Decisions on Forgery**

Forgery is viewed by Senate as a very serious breach of student matriculation oath and the rules and regulations of the University. The punishment for this offence is expulsion (dismissal) from the university. Forgery of any University document attracts same punishment.

13. **Grading System**

The grading system of the University is as follows:

		Grades	**Grade Points**
70% - 100%	- - -	A	5
60% - 69%	- - -	B	4
50% - 59%	- - -	C	3
45% - 49%	- - -	D	2
0% - 44%	- - -	F	0

14. **Graduation Requirements**

Every five-year programme has a maximum duration of seven years for graduation. If a student is unable to graduate within this period, the studentship of such a student shall be considered to have lapsed and the student should withdraw unless otherwise approved by Senate. For a student to graduate, the student must obtain a minimum of 150 or a maximum of 240 credit units for a five-year programme. Students must pass all core courses, GST before they can graduate.

15. **Award of Degree**

The type of degree awarded to a student will be determined by the final CGPA of the student in the final year as shown below:

Class of Degree	**CGPA Required**
First Class	**4.50 – 5.00**
Second Class Upper Division	**3.50 – 4.49**
Second Class Lower Division	**2.40 – 3.49**
Third Class	**1.50 – 2.39**

15.1 **Title of Degree**

The Department of Electronic and Computer Engineering offers TWO programmes leading to the award of **B.Eng. Electronic Engineering Degree** and **B.Eng. Computer Engineering Degree**.

15.2 **Withdrawal of Degrees**

All Degrees awarded by Veritas University, Abuja remain the property of the University. The University reserves the right to withdraw or effect correction at any time to a Degree that was awarded in error.

16. Nigeria University Engineering Students Association (NUESA)

The faculty houses the Veritas University Chapter of the Nigeria University Engineering Students Association. A registered student of the Department is automatically a member of the NUESA, which has the motto **'Towards Indigenous Technological Advancement'**. The association annually elects its executives, headed by a President, who is the intermediary between students and Faculty and Departmental Management. A student of the Department is strongly enjoined to partake in the association's activities.

17. Regulation on the Use of Engineering Workshop and Laboratory

Students coming into the Engineering Workshop and Laboratory to perform experiments are to observe in good faith, the following regulations for proper usage and management of the laboratory:

i. Wear a lab coat before entering and while in the workshop or laboratory
ii. Eating or drinking of any kind and at any time while in the workshop or laboratory is prohibited
iii. Students should not litter the workshop or laboratory space
iv. Playing or fighting inside the workshop or laboratory is prohibited
v. Do not sit or lie on a workshop or laboratory bench during practical and after class
vi. Buying and selling inside the workshop or laboratory is not allowed at any time
vii. Do not remove any equipment from the workshop or laboratory
viii. Do not remove ANYTHING from the workshop or laboratory
ix. Damage of any workshop or laboratory equipment must be promptly reported.

18. Curriculum of Engineering Programmes

Note: 100 & 200 Level Courses are Common to all the Departments in the Faculty of Engineering

Table 1: 100 level First Semester

COURSES	STATUS	TITLE	L	T	P	U
GST 111	R	Communication in English I	1	1	0	2
GST 121	R	Use of Library, Study Skills and ICT	2	0	0	2
GST 113	R	Nigerian People and Culture	2	1	0	2
GST 115	R	History and Philosophy of Science	2	1	0	2
GST 171	R	Ethics	0	0	2	1
CSC 101	R	Introduction to Computer Science	2	0	3	3
CHM 101	C	General Chemistry1	2	1	0	2
CHM 107	C	General Practical Chemistry I	0	0	3	1
MTH 101	C	General Mathematics I	2	1	0	3

PHY 101	C	General Physics I	2	1	0	2
PHY 107	C	General Practical Physics II Laboratory	0	0	3	1
GET 111	R	Basic Engineering Drawing	1	0	2	2
		TOTAL				23

Table 2: 100 level Second Semester

COURSES	**STATUS**	**TITLE**	**L**	**T**	**P**	**U**
GST 112	R	Logic, Philosophy and Human Existence	2	0	0	2
GST 122	R	Introduction to Church History	1	0	0	1
GST 124	R	Communication in French	0	0	2	2
GST 142	R	Community Service	0	0	0	0
MTH 102	C	General Mathematics II	2	1	0	3
CHM 102	R	General Chemistry II	3	0	0	2
CHM 104	R	General Practical Chemistry II	0	0	3	1
PHY 102	C	General Physics II	2	1	0	2
PHY 104	C	Experimental Physics II	0	0	3	1
STA 102	C	Statistics for Physical Sciences & Engineering	2	2	1	2
		TOTAL				21

Table 3: 200 level First Semester

COURSES	**STATUS**	**TITLE**	**L**	**T**	**P**	**U**
GST 211	R	Basic Spiritual Theology	2	0	0	2
GST 223	R	Introduction to Entrepreneurship	2	0	0	2
GST 221	R	Peace Studies and Conflict Resolution	2	0	0	2
GET 201	C	Applied Electricity	3	0	3	3
GET 203	C	Engineering Drawing, I	2	0	3	3
GET 205	C	Fundamentals of fluid Mechanics	3	0	0	3
GET 207	C	Applied Mechanics	3	0	3	3
GET 209	R	Engineering Mathematics	3	0	0	3
GET 211	R	Computer Programming	3	0	0	2
GET 213	R	General Engineering Laboratory Course	0	0	3	1
		TOTAL				24

Table 4: 200 level Second Semester

COURSES	STATUS	TITLE	L	T	P	U
GST 272	R	Social Teaching of the Church	2	0	0	0
GST 212	R	Ethics II	2	0	0	2
GET 202	C	Applied Electricity II	3	0	3	3
GET 204	C	Students Workshop Experience	0	0	3	1
GET 206	C	Fundamentals of Thermodynamics	3	0	3	3
GET 208	C	Strength Materials	3	0	0	2
GET 210	R	Engineering Mathematics II	3	0	0	3
GET 212	R	Engineering Materials	3	0	0	3
GET 222	C	Engineering Drawing II	3	0	3	3
GET 299	C	SIWES (8 Weeks)				2
		TOTAL				21

NB: At 100 and 200 levels, the Students of the Department of *Computer Engineering* take the same 100 and 200 level courses common to all Students of Faculty of Engineering

18.1 **Course Distribution for Electronic Engineering**

18.1.1 Course Outlines for 300 to 500 Level Courses: B.Eng. Electronic Engineering

Table 5: 300 level First Semester

COURSES	STATUS	TITLE	L	T	P	U
GST 311	R	Entrepreneurship	2	0	0	2
GET 301	R	Engineering Mathematics III	3	0	0	3
GET 303	R	Engineer-in-Society	2	0	0	2
EEE 301	C	Analogue Electronic Circuits	3	0	0	3
EEE 303	C	Circuit Theory I	3	0	0	3
EEE 305	C	Electrical Machines	3	0	0	3
EEE 307	C	Electromagnetic Fields and Waves I	3	0	0	3
CPE 301	C	Computer Organisation and Architecture	3	0	1	3
		TOTAL				22

Table 6: 300 level Second Semester

COURSES	STATUS	TITLE	L	T	P	U

GET 302	R	Engineering Mathematics IV	3	0	0	3
GET 304	R	Engineering Communication	2	0	0	2
GET 399	C	SIWES	0	0	3	3
EEE 302	C	Digital Electronic Circuits	3	0	0	3
EEE 304	C	Measurements and Instrumentation	3	0	0	3
EEE 314	C	Physical Electronics	3	0	0	3
EEE 316	C	Electromechanical System	3	0	0	3
EEE 320	C	Laboratory Practicals	0	0	1	3
		TOTAL				24

Table 7: 400 level First Semester

COURSES	**STATUS**	**TITLE**	**L**	**T**	**P**	**U**
EEE 401	C	Circuit Theory II	3	0	0	3
EEE 403	C	Communication Principles	4	0	3	4
EEE 405	R	Advanced Electronics	3	0	0	3
EEE 407	R	Control Theory	3	0	0	3
ELE 401	C	Advanced Electronic Circuits	3	0	0	3
ELE 403	C	Electronics I Laboratory	0	0	3	1
TEL 401	C	Electric Power Principles	3	0	0	3
		TOTAL				20

Table 8: 400 level Second Semester

COURSES	**STATUS**	**TITLE**	**L**	**T**	**P**	**U**
GET 499	C	SIWES III (24 Weeks)	0	0	0	6
		TOTAL				6

Table 9: 500 level First Semester

COURSES	**STATUS**	**TITLE**	**L**	**T**	**P**	**U**
EEE 503	C	Control Engineering	3	0	0	3

EEE 511	R	Analogue and Digital Computers	2	0	0	2
EEE 513	C	Microcomputer Hardware & Software Techniques	3	0	0	3
EEE 523	C	Solid State Electronics	3	0	0	2
EEE 525	C	Communications Systems Engineering	3	0	0	3
ELE 501	C	Power Electronics	3	0	0	3
ELE 503	C	Power Electronics Laboratory	0	0	2	1
GET 501	R	Engineering Management	3	0	0	3
		TOTAL				20

Table 10: 500 level Second Semester

COURSES	**STATUS**	**TITLE**	**L**	**T**	**P**	**U**
EEE 502	C	Reliability Engineering	2	0	0	2
EEE 504	C	Advanced Circuit Techniques	2	0	0	2
EEE 522	C	Telecommunications Engineering	2	0	0	2
EEE 528	C	High Frequency and Microwave	3	0	0	3
GET 502	R	Engineering Law	2	0	0	2
ELE 500	C	Project	0	0	0	6
	E	Any Elective	3	0	0	2
		TOTAL				19

Table 11: Electives

COURSES	**STATUS**	**TITLE**	**L**	**T**	**P**	**U**
EEE 524	E	Digital Signal Processing	3	0	0	2
EEE 526	E	Electroacoustics	3	0	0	2
		TOTAL				4

NOTE:

C = Compulsory L = Lecture Hours per Semester

P = Practical Hours per Semester E = Elective

T = Tutorial R = Required

18.1.2. **Course Descriptions**

100 Level First Semester

Students take most of these courses from the Faculty of Science and also the General Studies and Entrepreneurial Unit, where the latter exists in a university.

CSC 101: Introduction to Computer Science (3 Units: LH 30, PH: 45)

Survey of computers and information processing and their roles in society. This course introduces a historical perspective of computing, hardware, software, information systems, and human resources and explores their integration and application in business and other segments of society. Students will be required to complete lab assignments using the PC's operating system, and several commonly used applications, such as word processors, spreadsheets, presentations, graphics and other applications. Internet and online resources, browsers and search engines.

CHM 101: General Chemistry I (3 Units: LH 45)

Atoms, molecules and chemical reactions. Modem electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridization and shapes of simple molecules. Valence Forces; Structure of solids. Chemical equations and stoichiometry; Chemical bonding and intermolecular forces, kinetic theory of matter. Elementary thermochemistry; rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 107: General Practical Chemistry I (1 Unit: PH 45)

Laboratory experiments designed to reflect the topics taught in CHM 101 and CHM 1021 such as qualitative and quantitative chemical analysis, acid-base titrations. Gravimetric analysis. Calculation, data analysis and presentation. Functional group analysis.

GET 111: Basic Engineering Drawing (2 Units: LH 15; PH 45)

Introduction to Engineering Drawing as a means of communication. Drawing paper format. Use of drawing instruments. Types of lines and their uses in Engineering Drawing. Circles and tangent. Circles to satisfy conditions involving other circles, lines and points. Conic sections, various methods of their construction. Cycloid, epi and hypocycloids. Involute. Archimedes spiral. Loci: the helix (cylindrical and conical) single and multi-start threads. Coiling of compression and tension springs. Loci – Paths of points on moving link work. The theory of projection. Perspective (briefly), parallel projections (oblique – general, cavalier, cabinet). (Orthographic – Multi-view, two views, three views, auxiliary views). (Axonometric – Isometric, dimetric, trimetric). Multiview representation. 1st and 3rd angle representations. Isometric drawing. Oblique drawings. Revisions.

GST 111: Communication in English 1 (2 Units: LH 30)

Effective communication and writing in English; Language skills; writing of essay answers; Comprehension; Sentence construction; Outlines and paragraphs; Collection and organization of materials and logical presentation; Punctuation.

GST 121: Use of Library, Study Skills and 1CT (2 Units: LH 30)

Brief history of libraries; Library and education; University libraries and other types of libraries; 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 referencing. Development of modem ICT; Hardware technology; Software technology; Input devices; Storage devices; Output devices; Communication and internet services; Word processing skills (typing, etc).

MTH 101 General Mathematics I (3 Units: LH 45)

(Algebra and Trigonometry)

Elementary set theory, subsets, union, intersection, complements, Venn diagrams. Real numbers, integers, rational and irrational numbers. Mathematical induction, real sequences and series, theory of Quadratic equations, Binomial theorem, complex numbers, algebra of complex numbers, the Argand diagram. De-Moire's theorem, nth roots of unity. Circular measure, trigonometric functions of angles of any magnitude, addition and factor formulae.

PHY 101 General Physics I (3 Units: LH 45)

(Mechanics, Thermal Physics and Waves) Space and Time, Units and Dimension, Kinematics; Fundamental Laws of Mechanics, statics and dynamics; work and energy; Conservation laws. Moments and energy of rotation; simple harmonic motion; motion of simple systems; Elasticity; Hooke's law, Young's shear and bulk moduli, Hydrostatics; Pressure; buoyance, Archimedes' Principles; Surface tension; adhesion, cohesion, capillarity, drops and bubbles; Temperature; heat; gas laws; laws of thermodynamics; kinetic theory of gases; Sound. Types and properties of waves as applied to sound and light energies. Superposition of waves. Propagation of sound in gases, solids and liquids and their properties. The unified spectra analysis of waves. Applications.

PHY 107 General Practical Physics I (1 Unit: PH 45)

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 PHY 101 and PHY 102. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

100 Level Second Semester

GST 112: Logic, Philosophy and Human Existence (2 Units: LH 30)

A brief survey of the main branches of Philosophy; Symbolic logic; Special symbols in symbolic logic conjunction, negation, affirmation, disjunction, equivalent and conditional statements, law of tort. The method of deduction using rules of inference and conditionals, qualification theory. Types of discourse, nature or arguments, validity and soundness, techniques for evaluating arguments, distinction between inductive and deductive inferences; etc. (Illustrations will be taken from familiar texts, including literature materials, novels, law reports and newspaper publications).

GST 122: Communication in English II (2 Units: LH 30)

Logical presentation of papers; Phonetics; Instruction on lexis; Art of public speaking and oral communication; Figures of speech; Precis; Report writing.

GST 124: Communication in French (2 Units: LH 30)

Introduction to French, alphabets and numerals for effective communication (written and oral) and simple sentence construction based on communication approach. Comprehension and reading of simple texts.

GST 142: Community Service (2 Units: LH30)

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

CHM 102 General Chemistry II (2 Credits; L25 P0 T5)

Application of the principles of chemical and physical change to the study of the behaviour of matter and the interaction between matter. Course content includes chemical equilibrium, ionic equilibra, chemical thermodynamics, electrochemistry, chemical kinetics. Acids and bases. The chemistry of the representative elements and their common compounds with emphasis on gradation of their properties. Brief chemistry of the first series of transition elements, general principles of extraction of metals; introductory nuclear chemistry; survey of carbon compounds with overview of the common functional groups in aliphatic and benzenoid compounds. Reactions and reactions in Organic Chemistry.

CHM 104 General Chemistry Practical II (1 Credit, L0 P15 T0)

Examination of the physical properties (physical state, appearance, odour, ignition test) of organic compounds. Purification of organic compounds by recrystallization and distillation. The use of melting point and boiling point as criteria of purify. Solubility tests (in hot and cold water and in ether). Detection of elements present in organic compounds. Detection of functional groups present in organic compounds. A sequence of chemical reactions involving copper.

MTH 102:General Mathematics II (3 Units: LH 45)

(Calculus) Functions of a real variable, graphs, limits and idea of continuity. The derivative, as limit of rate of change. Techniques of differentiation, maxima and minima. Extreme curve sketching, integration, Definite integrals, reduction formulae, application to areas, volumes (including approximate integration: Trapezium and Simpson's rule).

PHY 102 General Physics II (2 Units: LH 30)

(Electricity, Magnetism and Modern Physics) Electrostatics; conductors and currents; dielectrics; magnetic fields and electro- magnetic induction; Maxwell's equations; electromagnetic oscillations and waves; Coulomb's law; methods of charging; Ohm's law and analysis of DC circuits; AC voltages applied to Inductors, capacitors and resistance; Applications.

PHY 108 General Practical Physics II (1 Unit: PH 30)

This is a continuation of the experiments designed for PHY 101 and PHY 102 some of which have been covered under PHY 107.

STA 102: Statistics for Physical Sciences and Engineering (2 Units: LH 30)

Scope for statistical methods in physical sciences and engineering. Measures of location, partition and dispersion. Elements of probability. Probability distribution: binomial Poisson, geometric, hypergeometric, negative-binomial, normal Poisson, geometric, hypergeometric, negative-binomial, normal, Student's t and chi-square distributions. Estimation (point and internal) and tests of hypotheses concerning population means proportions and variances. Regression and correlation. Non-parametric tests. Contingency table analysis. Introduction to design of experiments. Analysis of variance.

200 Level First Semester

GST 223: Introduction to Entrepreneurship: (2 Units: LH 30)

Introductory Entrepreneurial skills: Relevant Concepts: Enterprise, Entrepreneur, Entrepreneurship, Business, Innovation, Creativity, Enterprising and Entrepreneurial Attitude and Behaviour. History of Entrepreneurship in Nigeria. Rationale for Entrepreneurship, Creativity and Innovation for Entrepreneurs. Leadership and Entrepreneurial Skills for coping with challenge. Unit Operations and Time Management. Creativity and Innovation for Self-Employment in Nigeria. Overcoming Job Creation Challenges. Opportunities for Entrepreneurship, Forms of Businesses, Staffing, Marketing and the new Enterprise, Feasibility Studies and Starting a New Business. Determining Capital Requirement and Raising Capital. Financial Planning and Management. Legal Issues, Insurance and Environmental Considerations.

GET 201: Applied Electricity (3 Units: LH 45)

Fundamental concepts - Electric fields, charges, magnetic fields. Current, B - H curves Kirchhoff's laws, superposition. Thevenin, Norton theorems, Reciprocity, RL, RC, RLC circuits. DC, AC bridges, Resistance, Capacitance, Inductance measurement, Transducers, Single phase circuits, Complex J - notion, C circuits, Impedance, admittance, susceptance.

GET 203: Engineering Drawing I (2 Units: LH 15; PH 45)

Revision of multi -view representation. Harder examples on two and three view representation (1st and 3rd angles). Harder examples on isometric drawing to include simple pictorial assembly drawing in isometric. Harder examples on oblique drawing (Cavalier, Cabinet and Angles other than 45 degrees). Dimensioning. Sections and Conventions. Auxilliary views. Representation and specification of threads. Bolted joints. Keys and cottered joints. Conventional representations.

GET 205: Fundamentals of Fluid Mechanics (3 Units: LH 45)

Properties of fluids, Fluids statics, Basic conservation laws, friction effects and losses in laminar and turbulent flows in ducts and pipes. Dimensional analysis and dynamic similitude, principles of construction and operation of selected hydraulic machinery. Hydropower systems.

GET 207: Applied Mechanics (3 Units: LH 45)

Forces, moments, couples. Equilibrium of simple structures and machine parts. Friction. First and second moments of area; centroids. Kinematics of particles and rigid bodies in plane motion. Newton's laws of motion. Kinetic energy and momentum analyses.

GET 209: Engineering Mathematics I (3 Units: LH 45)

Limits, Continuity, differentiation, introduction to linear first order differential equations, partial and total derivatives, composite functions, matrices and determinants, Vector algebra, Vector calculus, directional Derivatives.

GET 211: Computer Programming I(3 Units: LH 30; PH 45)

Introduction to computers and computing. Problems solving on computer algorithm, design using flowchart and pseudo-code. Introduction to high level programming languages, Basic and FORTRAN syntax, flow of control, input/output constructs, data types. Programming in FORTRAN. Extensive exercises in solving engineering problems using flowchart and pseudo-code.

GET 213: General Engineering Laboratory Course (Unit 1: PH 45)

Laboratory investigation and report submission for selected experiments and projects in Thermodynamics, Applied Mechanics and Applied Electricity and Fundamentals of Fluid Mechanics.

GET 299:

Students Industrial Work Experience (2 Units: 8 weeks) On the job experience in industry chosen for practical working experience but not necessarily limited to the student's major (8 weeks during the long vacation following 200 level).

200 Level Second Semester

GST 272: Social Teaching of the Church (1 Units: LH 15)

Since theology does not restrict itself to spiritual matters alone but concerns itself with the entire human well-being, the course therefore with reference to the social teachings of the Church, examines the efforts Veritas University of the Church as also pastor of the material wellbeing of human persons, with special emphasis on human dignity and rights.

GET 202: Applied Electricity II (3 Units: LH 45)

Basic machines - DC, synchronous alternators, transformers, equivalent circuits. Three phase balanced circuits, PN junction Diode, Transistors, Thyristors FETs, Zener, Rectifiers. Basic control systems, open/closed loop systems. Communications fundamentals, introduction of TV, Radio, Telephone systems.

GET 222: Engineering Drawing II (2 Units: LH 15; PH 45)

Cams. Interpretation of solids. Development of surfaces. Detail drawing. Belts, Chains, Gears. Bearing and lubrication arrangements. Couplings brakes, Flexible shafts, Universal joints, etc. Assembly drawings. Revisions.

GET 204: Students Work Shop Experience (1 Unit: PH 45)

Introduction to practices and skills in general engineering through instruction in operation of hand and powered tools for wood and metal cutting and fabrication. Supervised hands - on experience in safe usage of tools and machines for selected tasks.

GET 206: Fundamentals of Thermodynamics (3 Units: LH 45)

Basic concepts, quantitative relations of Zeroth, first, second and third laws of thermodynamics. Behaviour of pure substances and perfect gases. Ideal gas cycles.

GET 208: Strength of Materials (3 Units: LH 45)

Consideration of equilibrium; composite members, stress-strain relation. Generalized Hooke's law. Stresses and strains due to loading and temperature changes. Torsion of circular members. Shear force, bending moments and bending stresses in beams with symmetrical and combined loadings. Stress and strain transformation equations and Mohr's circle. Elastic buckling of columns.

GET 210: Engineering Mathematics II (3 Units: LH 45)

Second order differential equations, line integral, multiple integral and their applications, differentiation of integral. Analytical functions of complex variables. Transformation and mapping. Special functions.

GET **212: Engineering Materials (3 Units: LH 45)**

Introduction to electronic configuration, atomic structures, inter-atomic bonding mechanisms, crystal and microstructure. Relationships between structure and properties of metals, alloys, ceramics and plastics. Principles of the behaviour of materials in common environments. Fabrication processes and applications.

GST 222: Peace and Conflict Resolution (2 Units: LH 30)

Basic Concepts in peace studies and conflict resolution; Peace as vehicle of unity and development;
Conflict issues; Types of conflict, e. g. Ethnic/religious/political/ economic conflicts; Root causes of conflicts and violence in Africa; Indigene/settler phenomenon; Peace – building; Management of conflict and security. Elements of peace studies and conflict resolution; Developing a culture of peace; Peace mediation and peace-keeping; Alternative Dispute Resolution (ADR). Dialogue/arbitration in conflict resolution; Role of international organizations in conflict resolution, e.g. ECOWAS, African Union, United Nations, etc.

GST 224: Leadership Skills (2 Units: LH 30)

Transformation is a fundamental shift in the deep orientation of a person, organization or society such that the world is seen in new ways and new actions and results become possible that were impossible prior to the transformation. Transformation happens at the individual level but must be embedded in collective practices and norms for the transformation to be sustained. Leadership Development Programme (LDP) proposes novel approaches to teaching and learning, which emphasizes the practical involvement of participants. It is interactive and involves exercises and actual implementation of breakthrough projects by teams that make difference in the lives of the target population. In this course, leadership concepts comprising of listening, conversation, emotional intelligence, breakthrough initiatives, gender and leadership, coaching and leadership, enrolment conversation and forming and leading teams will be taught.

ELECTRONIC ENGINEERING COURSE SYNOPSES FOR SEMESTER 300 TO 500 LEVEL

300 Level First Semester

GST 311: Entrepreneurship (2 Units: LH 30)

Profiles of business ventures in the various business sectors such as: Soap/Detergent, Tooth brush and Tooth paste making; Photography; Brick making; Rope making; Brewing; Glassware production/ Ceramic production, Paper production; Water treatment/conditioning/packaging; Food processing/preservation/packaging; Metal fabrication; Tanning industry; Vegetable oil extraction; Farming; Fisheries/aquaculture; Plastic making; Refrigeration/Air-conditioning; Carving, Weaving; Bakery; Tailoring; Printing; Carpentry; Interior decoration; Animal husbandry etc. Case Study Methodology applied to the development and administration of Cases that bring out key issues of business environment, start-up, pains and gains of growth of businesses, etc. with particular reference to Nigerian businesses. Experience sharing by business actors in the economy with students during Case presentations.

GET 301: Engineering Mathematics III (3 Units: LH 45)

Linear Algebra. Elements of Matrices, Determinants, Inverses of Matrices, Theory of Linear Equations, Eigen Values and Eigen Vectors. Analytical Geometry, Coordinate Transformation, Solid Geometry, Polar, Cylindrical and Spherical Coordinates. Elements of Functions of Several Variables, Surface Variables. Ordinary Integrals, Evaluation of Double Integrals, Triple Integrals, Line Integrals and Surface Integrals. Derivation and Integrals of Vectors, The Gradient of Scalar quantities. Flux of Vectors, The Curl of a Vector Field, Gauss, Greens and Stoke's Theorems and Applications. Singular Valued Functions. Multivalued Functions, Analytical Functions, Cauchy Riemann's Equations. Singularities and Zeroes, Contour Integration including the use of Cauchy's Integral Theorems, Bilinear Transformation.

GET 303: Engineering in Society (2 Units: LH 30)

Philosophy of Science and Engineering. History of Engineering and Technology. The Engineering Profession, Engineering literacy professional bodies and engineering societies. Engineers' code of conduct and ethics. Engineers and nation building - economy, politics, business, safety in Engineering and introduction in Risk analysis, invited lecturers from professionals.

STA 305: Statistics for Physical Sciences and Engineering 3 Units: LH 45)

Descriptive statistics, frequency distribution, populations and sample, central tendency, variance data sampling, mean, median, mode, mean deviation, percentiles etc. Probability. Binomial, poison hypergeometric, normal distributions, etc. Statistical inference intervals, tests hypothesis and significance. Regression and correlation.

EEE 301: Analogue Electronic Circuit (3 Units: LH 45)

Review of single-stage transistor amplifiers using BJS and FETs Equivalent circuit and calculation of current gain, voltage gain, power gain, input and output impedance. Operational amplifiers: Parameters and applications. Feedback, Broadband and narrowed band amplifies. Power amplifiers. Voltage and current stabilizing circuit. Voltage amplifiers, multi storage amplifier. Using BJTs and FETs.

EEE 303 Electric Circuit Theory I (3 Units: LH 45)

Circuit elements, circuit theorems, applications. Network response to steps, ramp, impulses. Network functions, response to exponential, sinusoidal sources. Laplace transform, polezero analysis, network synthesis, resonance, two-point analysis, ladder network. Star-Delta transformation, T, P Networks

EEE 305: Electrical Machines (4 Units: LH 60)

Review of electromechanical energy conversion, rotating magnetic fields, performance and methods of speed control of DC machines, induction motors, linear induction motors, circle diagrams, power transformers, and parallel operation of 3-phase transformers. Performance of synchronous machines, parallel operation of synchronous generators, fractional horse power motors, single-phase induction motors, universal motors. Reluctance motors, hysteresis motors. Faults on machines, methods of starting and protection of machines.

EEE 307: Electromagnetic Fields and Waves I (3 Units: LH 45)

Review of electromagnetic laws in integral form, Gauss's Law, Ampere's and Faraday's Laws; Electrostatic fields due to distribution of charge, magnetic fields in and around current carrying conductors, time-varying magnetic and electric fields; conduction and displacement current; Maxwell's equation (in rectangular co-ordinates and vector-calculus notation): Derivation of Maxwell's equations; electromagnetic potential and waves; Poynting vector; Boundary conditions; wave propagation in good conductors, skin effect; plane waves in unbounded dielectric media, Fundamentals of transmission lines, wave-guides and antennae.

EEE 315: Linear Systems (3 Units: LH 45)

Mathematical models of physical system. Analogous concepts in electrical, mechanical and thermal systems. Transfer functions. Block diagrams and signal flow graphs.

Feedback control system: advantages. Transient response of systems. The root-locus methods. Frequency response of systems. Bode and polar plots. System stability. Routh and Nyquist criteria. Introduction to analogue computer simulation.

300 Level Second Semester

GET 302: Engineering Mathematics IV (3 Units: LH 45)

Series solution of second order linear differential equations with variable coefficients. Bessel and Legendre equations. Equations with variable coefficients. Sturn-Louville boundary value problems. Solutions of equations in two and three dimensions by separation of variables. Eigen value problems. Use of operations in the solution of partial differential equations and Linear integral equations. Integral transforms and their inverse including Fourier, Laplace, Mellin and Handel Transforms. Convolution integrals and Hilbert Transforms. Calculus of finite differences. Interpolation formulae. Finite difference equations. Runge-Kutta and other methods in the solutions of ODE and PDEs. Numerical integration and differentiation.

GET 304: Engineering Communication (2 Units: LH 30)

Professional use of English Language for letters, specification descriptions, presentation of charts, graphs, tables, writing of proposals in reports. Case studies of major engineering designs and construction/fabrication as well industrial failures; professional presentation of reports and proposals.

GET 399: Students Industrial Work Experience II (3 Units: 12 weeks)

On the job experience in industry chosen for practical working experience but not necessarily limited to the student's major (12 weeks during the long vacation following 300 level).

EEE 302: Digital Electronics Circuit (3 Units: LH 45)

Number Systems and Codes. Logic Gate Simplification of Logic expressions using Boolean Algebra. Simplification of Logic expressions using Karnaugh Method. design combinational circuit. Flip-Flops. Application of Flip-Flops in the design of counters, registers and timers. Switching and Waves shipping circuit. Generation of non sinusoidal signal (multi vibrators). Introduction to ADC and DAC. Design of Logic Gates (Diode, DTL, TTL, ECL etc).

EEE 304: Measurements and Instrumentation (3 Units: LH 45)

General Instrumentation, Basic Meter in DC measurement. Basic meter in AC measurements; rectifier voltmeter, electro-dynamometer and Wattmeter, instrument transformers; DC and AC bridges and their applications; general form of AC bridge universal impedance bridge; Electronic instruments for the measurement of voltage, current resistance and other circuit parameter, electronic voltmeters, AC voltmeters using rectifiers, electronic multimeter, digital volumeters; oscilloscope: vertical deflection system, horizontal deflection system, probes, sampling CRO, Instruments for generating and analyzing waveforms; square-wave and pulse generator, signal generators, function generators, wave analysers, Electronic counters and their applications: time base circuitry, universal counter measurement modes; Analog and digital data acquisition systems: tape recorders, D/A and A/D conversions, sample and hold circuits.

EEE 314: Physical Electronics (3 Units: LH 45)

Free electron motion in static electric and magnetic fields, electronic structure of matter, conductivity in crystalline solids. Theory of energy hands in conductors, insulators and semi-conductors: electrons in metals and electron emissions; carriers and transport phenomena in semi-conductors, characteristics of some electron and resistors, diodes, transistors, photo cell and light emitting diode. Elementary discrete devices fabrication techniques and IC technology.

EEE 316: Electromechanical System (3 Units: LH 45)

Magnetic circuits. Basic principles of relays and activators; Ideal transformer. Equivalent circuits and basic analysis of practical transformers. D.C. machine contraction, characteristics of D.C. generators. Excitation of D.C. machines. Torque-speed characteristics of D.C. motors. A.C. machines; production of rotating magnetic fields. Simple theory of three-phase induction motors; torque speed characteristics, three-phase induction motors Single-phase motors-applications. Selection of motors, for practical applications. Synchronous machines.

EEE 320: Laboratory Practical (4 Units: PH 180)

Electrical Machines Laboratory: A laboratory work on electrical machines designed to illustrate topics covered in Electromechanical Devices and Machines. Telecommunication Laboratory: Laboratory work on telecommunication designed to illustrate topics covered in Communication Principles as well as topics such as passive filters, turned circuits and active analogue filters. Digital Electronics Laboratory: A laboratory work on digital electronics designed to illustrate topics covered in Electronic circuits. Electronic Circuits Laboratory: A laboratory work on electronic circuits designed to illustrate topics covered in Electronic Circuits

400 Level First Semester

EEE 401: Electric Circuit Theory II (3 Units: LH 45)

Networks, Node, Loop Analysis. Non-linear circuit analysis. Network functions, Locus diagrams. Filters; design, operation, low, high, band pass. Butterworth, Chebychev filters. Active network synthesis and analysis.

EEE 403: Communication Principles (4 Units: LH45; PH 45)

Amplitude modulation; double sideband, single sideband and vestigial sideband modulation schemes; simple modulators, power and bandwidth performance. Angle modulation; frequency modulation, phase modulation, band width requirements, clippers and limiters. Amplitude modulated signal reception; discrimination, frequency tracking loop, phase locked loop and noise performance. Commercial radio systems. Transmission media; attenuation in open space, air, cable and fibre channels; construction of cables and fibres, sampling theorem, pulse amplitude modulation, pulse width modulation, multiplexing, quantization systems and pulse code modulation, delta modulation, courses and correction of errors in PCM and DM.

EEE 405: Advanced Electronics (3 Units: LH 30)

Linear I.C. op-amp, linear and non-linear operations, logarithmic amplifiers, A/D and D/A converters, gyrators and negative impedance converters, the 555 timer.

EEE 407: Control Theory (3 Units: LH 45)

Basic concepts and examples of control systems; Feedback, Time response analysis, concept of stability, Routh-Hurwits criterion; Root-locus techniques, Frequency-response analysis, Polar and Bode plots, Nyquist stability criteria. Nicholas chart, compensation techniques chart, compensation techniques, introduction to non-linear systems

ELE 401: Advanced Electronic Circuits (3 Units: LH45)

Application of feedback theory, oscillators and frequency standards, precision analog techniques, low power circuit design, interfacing sensors, designing for high reliability, electronics for harsh environments.

ELE 403 Electronics I Laboratory (1 Unit: PH 45)

Experiments in design with diodes, power transistors, integrated circuits, advanced bipolar and FET logic gates, flip flops and registers.

TEL 401: Electric Power Principle (3 Units: LH 45)

Types of power station, operation, auxiliaries, economics of operation - stations, substations power supply economics, tariffs. Power factor correction. Poly-phase theory. DC, AC power distribution, network calculations, Overhead line conductors. Corona effect, voltage control, circuit breakers, load forecast, siting of generating plants.

400 Level Second Semester

GET 499: Students Industrial Work Experience III (6 Units: Wk 24)

500 LEVEL FIRST SEMESTER

EEE 503: Control Engineering (3 Units: LH 45)

State space description of linear systems, concepts of controllability and observability; state feedback, modal control observers, realisation of systems having specified transfer function, applications to circuit synthesis and signal processing.

EEE 511 Analogue & Digital Computers (2 Units: LH 30)

Analogue computation, electrical analogue of mechanical, electromechanical systems and servomechanisms. Analogue computer elements, potentiometers, operational amplifiers, multipliers, function generators, simulation

of systems transfer functions. Digital computer CPU, peripherals, storage. Arithmetic processes. Hybrid computer systems, parallel, vector, RISC's workstations.

EEE 513: Micro-Computer Hardware and Software Techniques (3 Units: LH 45)

Elements of digital computer design; control unit, micro-programming, bus organisation and addressing schemes. Micro-processors, system architecture, bus control, instruction execution and addressing modes. Machine codes, assembly language and high-level language programming, Micro-processors as state machines. Microprocessor interfacing: Input/output. Technique, interrupt systems and direct memory access; interfacing to analogue systems and applications to D/A and A/D converters. System development tools: simulators, EPROM programming, assemblers and loaders, overview of available microprocessor application.

EEE 523: Solid State Electronics (2 Units: LH 30)

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

EEE 525: Digital Communications System (2 Units: LH 30)

Block Diagram of digital communication system sampling theorem, Shannm theorem and applications in digital communication system. Advantages of digital signals . Noise in digital system. Filtering and equalisation. Digital modulation techniques: FSK, ASK, QPSK, M-PSK, QAM, etc. Error detection and correction techniques. Encoders/Decoders. Applications of digital communication system: Satellite communication, telephoning microwave, wireless communication, optical communication, Broadband. Communication. Internet Technology.

ELE 501: Power Electronics (3 Units: LH 45)

Power semiconductor devices in switching mode converter and control circuits, phase-controlled rectifiers, synchronous inverters, AC regulators, cyclo- convertors; self-commutated inverters; and frequency changers; thermal analysis and protection. Applications to industry and HVDC.

ELE 503 Power Electronics Laboratory (2 Units: LH 30)

An introduction to power electronic circuits is presented. Students will construct several dc/dc, dc/ac and ac/dc converters. Various switching algorithms, including pulse width modulation, delta modulation, and hysteresis control will be developed to regulate and control the respective circuits.

GET 501: Engineering Management (3 Units: LH 45)

Principles of organization; elements of organization; management by objectives. Financial management, accounting methods, financial statements, cost planning and control, budget and budgetary control. Depreciation

accounting and valuation of assets. Personnel management, selection, recruitment and training, job evaluation and merit rating. Industrial psychology. Resource management; contracts, interest formulae, rate of return,. Methods of economic evaluation. Planning decision making; forecasting, scheduling. Production control. Gantt Chart, CPM and PERT. Optimization, linear programming as an aid to decision making, transport and materials handling. Raw materials and equipment. Facility layout and location. Basic principles of work study. Principles of motion economy. Ergonomics in the design of equipment and process.

500 Level Second Semester

EEE 502: Reliability Engineering (2 Units: LH 30)

Introduction to Reliability, maintainability, availability, Elementary reliability theory. Application to power systems and electronic components. Test characteristics of electrical and electronic components. Types of fault. Designing for higher reliability. Packaging, Mounting, Ventilation. Protection from humidity, dust.

EEE 504: Advanced Circuit Techniques (3 Units: LH 45)

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 analogue circuits containing transistors and operational amplifiers. Simulation of circuit using appropriate packages e.g. PSPICE, Electronic workbench, Visio technical etc. should be encouraged.

EEE 512: Industrial Electronics Design (2 Units: LH: 30)

Characteristics and industrial applications of thyristors and other SCR devices. Transducers and their applications in sensing light, voltage pressure, motion, current temperature, etc. Mechanical relays, solid state relays and stepping motors. Real time control and remote control concepts in instrumentation. Micro-processor and micro-computer based systems. Fire alarms, burglar alarms and general home and industrial instrumentation.

EEE 522: Telecommunication Engineering (3 Units: LH 45)

Cable telegraphy and telephony characteristics, cross talk, equation, Poleliness, aerial and underground cables. Telegraph systems: codes, radio systems, terminal equipment (teleprinters, relays, switching systems, repeaters). Telephone receivers, switching (crossbar, electronic switches), PBX, PABX, Transmission standards, Telephone network structure.

EEE 524: Digital Signal Processing (2 Units: LH 30)

Discrete signals and Z-transform, digital Fourier Transform, Fast Fourier Transform. The approximation problem in network theory. Synthesis of low-pass filters. Spectral transforms and their application in synthesis of high-pass and band- pass filters. Digital filtering, digital transfer function aliasing, onedimensional recursive and non-recursive filters; Computer techniques in filter synthesis, Realisation of filters in hardware and software. Basic image processing concepts.

EEE 526: Electroacoustics (3 Units: LH 45)

Properties of sound. Microphones, loudspeakers studio equipment and stereophone. Disc recording the reproduction. Turntables, crystal, magnetic pick- ups, recording, reproduction. Acoustic design of buildings.

EEE 528: High Frequency and Microwave Electronics (3 Units: LH 45)

A survey of microwave engineering, models in waveguides and resonators, passive components, reactive and resistive elements, directional couples and tees ferrite isolators and circulators active components. Klystrons, magnetrons, travelling wave tubes, parametric amplifiers and solid state sources, introduction to varactor. PIN, Gunn-effect diode photodiode, phototransistor.

GET 502: Engineering Law (2 Units: LH 30)

Common Law: Its history, definition, nature and division. Legislation codification interpretation. Equity: Definition and its main spheres. Law of contracts for Engineers: offer, acceptance, communication termination. General principles of criminal law. Law of torts: definition, classification and liabilities. Patents: requirements, application, and infringement. Registered designs: application, requirements, types and infringement. Company law. Labour law and Industrial Law.

18.2 Course Outlines for 300 to 500 Level – Computer Engineering

300 Level First Semester

Course Code	Status	Course Title	Contact Hours			Units
			L	T	P	
CPE 301	C	Computer Organisation & Architecture	3	0	0	3
EEE 301	C	Analogue Electronic Circuit	3	0	0	3
EEE 303	C	Circuit Theory I	3	0	0	3
EEE 305	C	Electrical Machines	3	0	0	3
EEE 307	C	Electromagnetic Fields & Waves I	3	0	0	3

GET 301	R	Engineering Mathematics III	3	0	0	3
GET 303	R	Engineer-in-Society	2	0	0	2
GST 311	C	Entrepreneurship	2	0	0	2
	TOTAL					22

300 Level Second Semester

Course Code	Status	Course Title	Contact Hours			Units
			L	T	P	
CPE 300	C	Laboratory Courses	3	0	0	3
CPE 302	C	Software Development Techniques	3	0	0	3
EEE 302	C	Digital Electronic Circuit	3	0	0	3
EEE 304	C	Measurement & Instrumentation	3	0	0	3
GET 302	R	Engineering Mathematics IV	3	0	0	3
GET 304	R	Engineering Communication	2	0	135	2
GET 399	C	SIWES II	3	0	0	3
	TOTAL					20

400 Level First Semester

Course Code	Status	Course Title	Contact Hours			Units
			L	T	P	
CPE 400	C	Laboratory Courses	2	0	6	2
CPE 401	C	Microprocessor System & Interfacing	3	0	0	3
CPE 403	R	Data Communication & Network	3	0	0	3
CPE 405	C	Computer Software Engineering	4	0	0	4
CPE 407	R	Control System	3	0	0	3
CPE 409	C	Assembly Language Programming	3	0	0	3
CPE 411	R	Prototyping Techniques	2	0	0	2
	TOTAL					20

400 Level – Second Semester

Course Code	**Status**	**Course Title**	**Contact Hours**			**Units**
			L	T	P	
GET 499	C	SIWES III (24 Weeks)	0	0	0	6
	TOTAL					6

500 Level – First Semester

Course Code	Status	Course Title	Contact Hours			Units
			L	T	P	
CPE 501	C	Reliability and Maintainability	3	0	0	3
CPE 503	C	Software Engineering	3	0	0	3
CPE 505	C	Digital System design with VHDL	3	0	0	3
CPE 507	C	Cyberpreneurship & Cyberlaw	2	0	0	2
CPE 509	C	Computer Security Techniques I	3	0	0	3
GET 501	R	Engineering Management	3	0	0	3
CPE 501	E	Any one Elective	2	0	0	2
	TOTAL					22

Electives

Course Code	Status	Course Title	Contact Hours			Units
			L	T	P	
CPE 511	E	Fuzzy Logic & Programming	2	0	0	2
CPE 513	E	Cryptography Principle & Applications	2	0	0	2
CPE 515	E	Computer Security Techniques II	2	0	0	2

500 Level – Second Semester

Course Code	Status	Course Title	Contact Hours			Units
			L	T	P	
CPE 502	C	Embedded system design	3	0	0	3
CPE 504	C	Digital Signal Processing	3	0	0	3
CPE 506	C	Artificial Neural Network	3	0	0	3
CPE 508	C	Computer Graphics & Animation	3	0	0	3
GET 502	R	Engineering Law	2	0	0	2
CPE 555	C	Project	0	0	0	6
	E	Any Elective	2	0	0	2
	TOTAL					22

Electives

Course Code	Status	Course Title	Contact Hours			Units
			L	T	P	

CPE 510	E	Digital Image Processing	2	0	0	2
CPE 512	E	Robotic & automation	2	0	0	2
CPE 514	E	Digital Speech Processing	2	0	0	2

NOTE:

C = Compulsory L = Lecture Hours per Semester

P = Practical Hours per semester E = Elective

T = Tutorial R = Required

18.2.1 COMPUTER ENGINEERING COURSE SYNOPSES FOR 300 TO 500 LEVEL

300 Level – First Semester

GST 311: Entrepreneurship (2 Units: LH 30)

Profiles of business ventures in the various business sectors such as: Soap/Detergent, Tooth brush and Tooth paste making; Photography; Brick making; Rope making; Brewing; Glassware production/ Ceramic production, Paper production; Water treatment/conditioning/packaging; Food processing/preservation/packaging; Metal fabrication; Tanning industry; Vegetable oil extraction; Farming; Fisheries/aquaculture; Plastic making; Refrigeration/Air-conditioning; Carving, Weaving; Bakery; Tailoring; Printing; Carpentry; Interior ecoration; Animal husbandry etc. Case Study Methodology applied to the development and administration of Cases that bring out key issues of business environment, start-up, pains and gains of growth of businesses, etc. with particular reference to Nigerian businesses. Experience sharing by business actors in the economy with students during Case presentations.

GET 301: Engineering Mathematics III (3 Units: LH 45)

Linear Algebra. Elements of Matrices, Determinants, Inverses of Matrices, Theory of Linear Equations, Eigen Values and Eigen Vectors. Analytical Geometry, Coordinate Transformation, Solid Geometry, Polar, Cylindrical and Spherical Coordinates. Elements of Functions of Several Variables, Surface Variables. Ordinary Integrals, Evaluation of Double Integrals, Triple Integrals, Line Integrals and Surface Integrals. Derivation and Integrals of Vectors, The Gradient of Scalar quantities. Flux of Vectors, The Curl of a Vector Field, Gauss, Greens and Stoke's Theorems and Applications. Singular Valued Functions. Multivalued Functions, Analytical Functions, Cauchy Riemann's Equations. Singularities and Zeroes, Contour Integration including the use of Cauchy's Integral Theorems, Bilinear Transformation.

GET 303: Engineering in Society (2 Units: LH 30)

Philosophy of Science and Engineering. History of Engineering and Technology. The Engineering Profession, Engineering literacy professional bodies and engineering societies. Engineers' code of conduct and ethics.

Engineers and nation building - economy, politics, business, safety in Engineering and introduction in Risk analysis, invited lecturers from professionals.

STA 305: Statistics for Physical Sciences and Engineering 3 Units: LH 45)

Descriptive statistics, frequency distribution, populations and sample, central tendency, variance data sampling, mean, median, mode, mean deviation, percentiles etc. Probability. Binomial, poison hypergeometric, normal distributions, etc. Statistical inference intervals, tests hypothesis and significance. Regression and correlation.

EEE 301: Analogue Electronic Circuit (3 Units: LH 45)

Review of single-stage transistor amplifiers using BJ S and EETs Equivalent circuit and calculation of current gain, voltage gain, power gain, input and output impedance. Operational Amplifiers: Parameters and applications. Feedback, Broadband and narrowed band amplifies. Power amplifiers. Voltage and current stabilizing circuit. Voltage amplifiers, multi storage amplifier. Using BJTs and FETs.

EEE 305: Electrical Machines (3 Units: LH 45)

Review of electromechanical energy conversion, rotating magnetic fields, performance and methods of speed control of DC machines, induction motors, linear induction motors, circle diagrams, power transformers, parallel operation of 3-phase transformers. Performance of synchronous machines, parallel operation of Veritas University, Abuja: Curriculum & Syllabus: BS synchronous generators, fractional horse power motors, single-phase induction motors, universal motors. Reluctance motors, hysteresis motors. Faults on machines, methods of starting and protection of machines.

EEE 307: Electromagnetic Fields and Waves I (3 Units: LH 45)

Review of electromagnetic laws in integral form, Gauss's Law, Ampere's and Faraday's Laws; Electrostatic fields due to distribution of charge, magnetic fields in and around current carrying conductors, time-varying magnetic and electric fields; conduction and displacement current; Maxwell's equation (in rectangular co-ordinates and vector-calculus notation): Derivation of Maxwell's equations; electromagnetic potential and waves; Poynting vector; Boundary conditions; wave propagation in good conductors, skin effect; plane waves in unbounded dielectric media, Fundamentals of transmission lines, wave-guides and antennae.

CPE 301: Computer Organisation and Architecture (3 Units: LH 45)

Computer Fundamentals: Development history of computer hardware and software. Hardwired vs. stored program concept. Von-Neuman architecture. Havard architecture: principle of operation, advantages, disadvantages. Single address machine. Contemporary computers. Computer system: block diagram, functions, examples, dataflow, control line. Computer Arithmetic: integer arithmetic (addition, subtraction, multiplication,

division), floating-point representation (IEEE), floating-point arithmetic. arithmetic and logic unit (ALU). Introduction to CISC and RISC architecture: principle of operation, merits, demerits. Storage and Input/Output Systems: Computer function (fetch and execute cycles), interrupts, interconnection structures (Bus structure and bus types), Overview of memory system, memory chip organization and error correction, cache memory, memory storage devices. Overview of I/O, programmed and interrupt-driven I/Os, DMA, I/O channel and I/O processor. Control Unit: Microoperations, control of the CPU, hardwired implementation, control unit operation, micro-instruction sequencing and execution, micro-programmed control. Use INTEL family, and MOTOROLA family as case study of a CISC computer system. Instruction Set and Register: Machine instruction characteristics, types of operands and operations, instruction functions, addressing modes, instruction formats, register organization, instruction pipelining. High performance computer systems: Techniques to achieve high performance, pipelining, storage hierarchy, units with function dedicated for I/O. ISC, introduction to superscalar processor, parallel processor. Use popular ISC processor (e.g. i960, Motorola PowerPC) as case study. Operating System: Overview of operating system, dimension and type of operating management, virtual memory, UNIX/LINUX operating system: architecture, commands, programming; window based operating systems (MS windows,).

300 Level – Second Semester

GET 302: Engineering Mathematics IV (3 Units: LH 45)

Series solution of second order linear differential equations with variable coefficients. Bessel and Legendre equations. Equations with variable coefficients. Sturn-Louville boundary value problems. Solutions of equations in two and three dimensions by separation of variables. Eigen value problems. Use of operations in the solution of partial differential equations and Linear integral equations. Integral transforms and their inverse including Fourier, Laplace, Mellin and Handel Transforms. Convolution integrals and Hilbert Transforms. Calculus of finite differences. Interpolation formulae. Finite difference equations. Runge-Kutta and other methods in the solutions of ODE and PDEs. Numerical integration and differentiation.

GET 304: Engineering Communication (2 Units: LH 30)

Professional use of English Language for letters, specification descriptions, presentation of charts, graphs, writing of proposals in reports. Case studies of major engineering designs and construction/fabrication as well industrial failures; professional presentation of reports and proposals.

GET 399: Students Industrial Work Experience II (3 Units: 12 weeks)

On the job experience in industry chosen for practical working experience but not necessarily limited to the student's major (12 weeks during the long vacation following 300 level).

EEE 302: Digital Electronics Circuit (3 Units: LH 45)

Number Systems and Codes. Logic Gate Simplification of Logic expressions using Boolean algebra. Simplification of Logic expressions using Karnaugh Method. esign combinational circuit. Flip-Flops. Application of Flip-Flops in the design of counters, registers and timers. Switching and Waves shipping circuit. Generation of non-sinusoidal signal (multi vibrators). Introduction to ADC and DAC. Design of Logic Gates (Diode, DTL, TTL, ECL etc)

EEE 304: Measurements and Instrumentation (3 Units: LH 45)

General Instrumentation, Basic Meter in DC measurement. Basic meter in AC measurements; rectifier voltmeter, electro-dynamometer and Wattmeter, instrument transformers; DC and AC bridges and their applications; general form of AC bridge universal impedance bridge; Electronic instruments for the measurement of voltage, current resistance and other circuit parameter, electronic voltmeters, AC voltmeters using rectifiers, electronic multimeter, digital volumeters; oscilloscope: vertical deflection system, horizontal deflection system, probes, sampling CRO, Instruments for generating and analyzing waveforms; square-wave and pulse generator, signal generators, function generators, wave analysers, Electronic counters and their applications: time base circuitry, universal counter measurement modes; Analog and digital data acquisition systems: tape recorders, D/A and A/D conversions, sample and hold circuits.

CPE: 302 Software Development Techniques (3 Units: LH 45)

Software development life cycle. Top-Down design. Program, design using pseudo-code, flowchart. Flowchart ANSI symbols and usage. Extensive examples, and exercises using pseudo-code/flowchart to solve practical problems in engineering. Debugging and documentation techniques. Programming using a structural language such as C: Symbols, keywords, identifiers, data types, operators, various statements, operator precedence, type conversion, conditional and control structures, function, recursive functions. Arrays: 1-D, and multi-dimensional arrays, passing elements or whole array to a function. Simple sorting and searching on arrays, pointers, strings, dynamic memory allocation. Structures and Unions: Structure declaration and definition, accessing structures, array of structures, pointers and structures, union declaration, enumerated variables. File Handling: Concept of a file, files and streams, standard file handling functions, binary files, and random access files. Advanced Topics: Command line parameters, pointers to functions, creation of header files, stacks, linked lists, bitwise manipulation. Software development in C in MS Windows, UNIX/LINUX environments, header file, preprocessor directives, make, makefile. Static and dynamic linking libraries. Extensive examples, and exercises programming in C to solve practical problems in engineering. Exercises are to be done in the Computer Laboratory.

400 Level – First Semester

CPE 401: Microprocessor System and Interfacing (Units 3 LH45)

A basic microprocessor system: the CPU, memory, I/O, and buses subsystems, basic operation of a microprocessor system: fetch and execute cycle, the architecture of some typical 8-bit, 16-bit microprocessors (INTEL, MOTOROLA) and their features. Programming model in real mode: registers, memory, addressing modes. Organisation of the interrupt system, interrupt vectors, and external interrupts, implementation of single and multiple interrupts in real mode. Programming model in protected mode: registers, memory management and address translation, descriptor and page tables, system control instructions, multitasking and memory protection, addressing modes, and interrupt system. Memory interfacing and address decoding. I/O interfacing: memory mapped I/O, isolated i/o, bus timing, i/o instructions. Peripheral devices interfacing: 8255 PPI/6821 PIA, 8251 US RT/6821 U RT, DMA, Timer/Counter chips, etc. Instruction set. Assembly language Programming of INTEL and MOTOROLA microprocessors. Discussion of a typical system e.g. IBM PC, Apple Macintosh.

CPE 403: Data Communication and Network (Units: 3 LH 45)

Introduction to Data communications: the Development of Data Communications; types and sources of data, simple communications network, transmission definitions, one way transmission, half duplex transmission, transmission codes, transmission modes, parallel transmission, serial transmission, bit synchronization, character synchronization, character synchronization, synchronous transmission, asynchronous transmission, efficiency of transmission, error detection methods and data compression. Protocols: Introduction to network protocol. Seven Layer ISO-OSI standard protocols and network architecture. Transport protocols, session services protocols, and other protocols. Institute of Electrical and Electronics Engineering 802 standards. Error control and Data Compression: Forward Error Control; error detection methods; parity checking; linear block codes, cyclic redundancy checking; feedback error control, data compression, Huffman coding and dynamic Huffman coding. Local Area Networks: medium access control techniques – Ethernet, token bus and token ring; LAN standards; fibre distributed data interface, metropolitan area network. Peer-to-peer, Client Server. Client-Server Requirements: GUI design standards, interface independence, platform independence, transaction processing, and connectivity, reliability, backup and recovery mechanisms. Information Network Software; Features and benefits of major recovery mechanisms. Information Network Software: features and benefits of major Network Operating Systems. Network OS: (e.g. Novell NetWare, UNIX/LINUX, OS/2 & Windows NT). TCP/IP and Network OS. INTERNET: Definition, architecture, services, Internet addressing. Internet protocol, IPv4, IPv6. Internet programming, Intranet. System administration, and security issues.

CPE 405 Computer Software Engineering (Units: 3 LH 45)

Introduction to software engineering fundamentals. Object oriented programming. Number representations. Data structure and algorithms, Abstraction, modules and objects. Designing for efficiency. Object oriented software

design, implementation and testing. Team software specification and management. Cross-platform tools and GUI development. Advanced software algorithms and architecture. Software engineering practice and methods.

CPE 407: Control System Units: 3 LH 45)

Introduction: definition, examples of control systems. Open-loop and closed-loop control systems. Review of Laplace and inverse Laplace transforms. System modelling: Signal flow graph, block diagram. Transfer function. Poles and zeros. Block diagram reduction using signal flow graph and block diagram reduction techniques. Mechanical, electrical and electromechanical systems. First and second order models, higher order models. Definitions of transient response parameters. Analysis of second-order system as prototype. Routh-Hurwitz stability criterion. Classification of systems based on steady-state characteristics, steady-state error coefficient. Definition of Root locus, Properties of root locus, sketching of root locus plots. Effect of open-loop zeros and poles. Root locus design concepts. Frequency response analysis and design: Bode diagram, Polar plot, Nichols plot. Nyquist stability criterion: non-mathematical description of Nyquist criterion, interpretation of stability. Relative stability - Gain and phase margins. Closed-loop frequency response analysis - M and N contours, Nichols chart. Compensation techniques: lag, lead and lag-lead compensation, PD, PI and PID controllers. Cascade compensation based on root-locus method. Introduction to Feedback compensation. Computer-aided design and analysis of control system.

CPE 409 Assembly Language Programming (Units: 3 LH 45)

Introduction: Language level of abstraction and effect on machine, characteristics of machine code, advantages, justifications of machine code programming, instruction set and dependency on underlying processor. Intel 8086 microprocessor assembly language programming: Programming model as resources available to programmer, addressing modes, instruction format, instruction set- arithmetic, logical, string, branching, program control, machine control, input/output , etc; assembler directives, hand-assembling, additional 80x86/Pentium instructions. Modular programming. Interrupt and service routine. Interfacing of assembly language to C . Intel 80x87 floating point programming. Introduction to MMX and SSE programming. Motorola 680x0 assembly language programming. Extensive practical engineering problems solving in assembly language using MASM for Intel, and cross-assembler for Motorola.

CPE 411 Prototyping Techniques (Units: 2 LH 30)

Introduction: Grounding, ground plane, digital ground, analogue ground, power decoupling, inductance and capacitive effects, feedthrough capacitors. Soldering techniques for pass-through and surface mount components, desoldering. Breadboarding, veroboarding. Wire wrapping techniques. Radio Frequency design and implementation techniques. Printed Circuit Board techniques, and production of PCB. Use of PCB CAD packages. Construction exercises using different prototyping techniques.

400 Level – Second Semester

GET 499: Students Industrial Work Experience III (6 Units: Wk 24)

500 Level – First Semester

CPE 501 Reliability and Maintainability (Units: 3 LH 45)

Introduction to reliability, maintainability, reliability specification and metrics. Application to computer hardware system, communication equipment, power systems, electronic components. Basic maintenance types, and procedures of computer and digital communication system. ault troubleshooting techniques. QoS and time of availability of data communication. Quality control techniques. Design for higher reliability, fault tolerance. Software Reliability: software reliability specification, software reliability Metrics, fault avoidance, fault tolerance, programming for reliability, software safety and hazard analysis. Comparison of hardware and software reliability. Software Quality and Assurance: definition of software quality, software quality factors, quality control, cost of quality, quality assurance. SQA activities, formal technical reviews, software quality metrics, statistical quality assurance. ISO 9000 Requirements and Certification, ISO 9000 -3 for software quality process, process documentation, quality audit. Capability Maturity Model: Software Engineering Institute, levels of maturity, key process areas, Comparison between ISO 9000 Standards and CMM. Ensuring Quality and Reliability: verification and validation, measurement tracking and feedback mechanism, total quality management, risk management.

CPE 505 Digital System Design with VHDL (Units: 3 LH 45)

Finite State Machine: definition, mealy and Moore models, state diagram, state table, transition table. Sequential circuits design using flip-flops, asynchronous, and synchronous circuit design. Algorithm State Machine. Design examples and exercises. Structured Design: Design constructs, Design Levels, Geometry-based interchange formats, Computer aided electronic system design tools, Schematic circuit capture, Hardware description languages, Design process (simulation, synthesis), Structural design decomposition. Introduction to VHDL: VHDL language abstractions, Design hierarchies, VHDL component, Lexical description, VHDL source file, Data types, Data objects, Language statements, Concurrent VHDL, Sequential VHDL, Advanced features of VHDL (library, package and subprograms). Structural level modelling, Register-Transfer level modelling, FSM with data path level modelling, Algorithmic level modelling. Introduction of ASIC, Types of ASIC, ASIC design process, Standard cell ASIC synthesis, FPGA Design Paradigm, FPGA synthesis, FPGA/CPLD Architectures. VHDL Design: Top-down design flow, Verification, simulation alternatives, simulation speed, Formal verification, Recommendations for verification, Writing R L VHDL code for synthesis, top-down design with

FPGA. VHDL synthesis, optimization and mapping, constraints, technology library, delay calculation, synthesis tool, synthesis directives. Computer-aided design of logic circuits.

CPE 507 Cyberpreneurship & CyberLaw (Units: 2 LH 30)

Introduction: Definition of creativity, innovation, examples of creativity leading to innovation, commercialization of creative and innovative ideas. Trends in technology development. Entrepreneurship management and ownership. Characteristics of entrepreneur, starting a new business, business planning, strategic planning & management, site selection and layout. Establishing new venture, risk management. Business Plan Development: definition, need, preparation of business plan. Forecasting developments and charting an action plan Identifying the product/service, market research and feasibility study. Financing business. Sources of debt financing. Creating the marketing plan, pricing, creative advertising and promotion. Entrepreneurship case studies: Overview and analysis of successful entrepreneurs such as Bill Gates, Michael Dell, David Filo and Jerry Yang of Yahoo, etc. Nigerian Entrepreneurship: Discussion of Nigerian business environment, and illustrated with successful Nigerian entrepreneurs. Overview of the Nigerian Legal System: Civil and criminal. Basic concepts of law. Contract Law. . Current issues: digital signatures, Intellectual property and copyright. Speech Law: Defamation, Sedition, Printing Press Act. Speech on the Internet. Advertising Code: Made in Nigeria rules and guidelines, Advertising Standards. Media and Licensing law in Nigeria: Developing an in-depth understanding of the nature and function of Nigerian media law. Public and Private licensing. Intellectual and moral rights. Music royalties, synchronization rights, performance rights. Role of music publishers. Broadcast rights, merchandising. Detailed analysis of Communications and Multimedia Act. Ethic and Etiquette: New codes of social behaviour: the right to privacy.

CPE 509 Computer Security Techniques I (Units 2 LH 30)

Introduction: Overview of computer security, attacks and services, control of hardware / software. Usage. Intruders, Viruses and Worms: Intrusion techniques. Nontechnical attacks. Password protection and its vulnerability. Intrusion detection. Nature of viruses. Malicious programs. Types of viruses. Antivirus approaches. Worm propagation and countermeasures: access control, intrusion detection and firewalls. Disaster Recovery: Recovery requirements, policy, strategy, technical team. Execution of recovery plans. Documentation and backup system. Loss estimation. Developing Secure Computer System: External Security Measures, Issue, Security Models [Specification and Verification, Bell and LaPadulla Model, Clark-Wilson Model, Goguen-Meseguer, TCPEC], Discretionary Access Requirements, Mandatory Access Requirements, User Authentication, Access and Information Flow Control, Auditing and Intrusion Detection, Damage Control and Assessment, Microcomputer Security. Entropy, perfect secrecy, unicity distance, complexity theory, NP completeness, number theory. Cryptographic System, Public Key Systems, digital signatures. Network and Telecommunication

Security: Fundamentals, Issue, Objective and Threats, Security Services, Distributed System Security, The Trusted Network Interpretation, TNI Security Services, AIS Interconnection Issues, Firewalls [Gateways, Application, Cost and Effectiveness .Database Security: Security Requirements to Databases, Designing the Security, Methods of Protection, Security of Multilevel Database.

CPE 511 Fuzzy Logic & Programming (Units: 2 LH 30)

Introduction: fuzzy set theory, knowledge base problem, objective and subjective knowledge, crisp sets, fuzzy sets, linguistic variables, membership functions.

Set theoretic operations, comparison between crisp sets and fuzzy sets. Law of Contradiction and Law of Excluded Middle, fuzzy intersection, union and complement, and other fuzzy operators. Fuzzy relations and compositions on the same and different product spaces. Max-Min composition, Max-Product composition, fuzzy relational matrix, sup-star composition. Hedges or modifiers of linguistic variables, fuzzy logic vs. probability. Fuzzy reasoning and implication, the fuzzy truth tables, traditional propositional logic and the rule of inference, the Modus Ponens and Modus Tollens, fuzzy modelling with causal IF-THEN statements. Fuzzy Models, fuzzy logic systems, combination of fuzzy basis functions, universal approximator, fuzzy neural network, fuzzy associate memory matrix, self-learning fuzzy systems. Fuzzy logic system applications. Fuzzy programming.

CPE 513 Cryptography Principles & Applications (Units:2 LH 30)

History of cryptographic System, Public Key Systems, Digital Signatures. Information Theory: Entropy, Perfect Secrecy, Unicity Distance, Complexity Theory, NP Completeness, Number Theory. Data Encryption Methods : Transposition Ciphers, Substitution Ciphers, Product Ciphers, Exponentiation Ciphers, Knapsack Ciphers, Breakable NP-Complete Knapsack, Encryption Standards DES, RSA, Elliptic Curves. Cryptographic Techniques: Block and Stream Ciphers, Autokey, Endpoints of Encryption, One-way Ciphers, Password and Authentication, Secret Keys and Public Keys, Threshold Scheme. Video scrambling techniques. Digital video encryption techniques: principle, IRDETO, Viaaccess, Videoguard, etc. Security and Legality Issues: Copyrights, Patents, Trade Secret, Ownership of Products, Computer Crimes, Ethical Issue in Computer Security.

CPE 515 Computer Security Techniques II (Units: 2 LH 30)

History of cryptographic System, Public Key Systems, Digital Signature. Information Theory: Entropy, Perfect Secrecy, Unicity Distance, Complexity Theory, NP Completeness, Number Theory. Data Encryption Method Ciphers, Knaspsack Ciphers, Breakable NP-Complete Knapsack, Encryption Standards DES, RSA, Elliptic Curves. Cryptographic Techniques: Block and Stream Ciphers, Autokey, Endpoints of Encryption, One-Way Ciphers, Password and Authentication, Secret Keys and Public Keys, Threshold Scheme. Video Scrambling techniques. Digital video encryption techniques: principle, IRDETO, via access, Video guard, etc. Security and

Legality Issues: Copyrights, Patents, Trade Secret, Ownership of Products, Computer Crimes, Ethnical Issue in Computer Security.

GET 501: Engineering Management (3 Units: LH 45)

Principles of organization; elements of organization; management by objectives. Financial management, accounting methods, financial statements, cost planning and control, budget and budgetary control. Depreciation accounting and valuation of assets. Personnel management, selection, recruitment and training, job evaluation and merit rating. Industrial psychology. Resource management; contracts, interest formulae, rate of return,. Methods of economic evaluation. Planning decision making; forecasting, scheduling. Production control. Gantt Chart, CPM and PERT. Optimization, linear programming as an aid to decision making, transport and materials handling. Raw materials and equipment. Facility layout and location. Basic principles of work study. Principles of motion economy. Ergonomics in the design of equipment and process

500 Level Second Semester

CPE 502 Embedded System Design (Units: 3 LH 45)

Introduction to embedded system, components, characteristics, applications. Intel 8051/8031 Micro-controller: Features of the 8051/8031 family, block diagram and definitions of the pin of the 8051, I/O port structure, memory organisation: general purpose RAM, bit addressable RAM, register bank, special function registers, external memory, memory space mapping and decoding, bus control signals timing, a typical 8051 microcontroller based system. Instruction Set and Assembly Language Programming: Addressing modes, the 8051 instruction set and typical examples, assembler operation, assembly language format, assembler directives, operation of assemblers and linkers, programming examples. On-chip Peripheral Devices: I/O ports, operations and uses of port 0, port 1, port 2, port 3, timers: their operations, programming, and applications, serial port: operations and programming, typical applications, serial port interrupt. Interfacing to external memory, keypad, seven-segment LED display, ADC and DAC chips, and input / output port expansion, description and uses of hardware development tools. MOTOROLA M6811 Micro-controller: Features of the M6811 family, block diagram and definitions of the pin of the M6811, I/O port structure, memory organisation: general purpose RAM, bit addressable RAM, register bank, special function registers, external memory, memory space mapping and decoding, bus control signals timing. Instruction Set and Assembly Language Programming. On-chip peripheral devices and I/O interfacing. Introduction to PIC microcontroller: general architecture, applications and selection of microcontroller, advantages, low-end, and high performance PIC. Specific PIC microcontrollers: Features, architecture, block diagram, pin configuration, on-chip memory, and peripheral. Instruction set and Assembly language programming. Serial I/O interfacing: I2C, and SPI interfacing and programming. Memory interfacing: external memory interfacing, EEPROM and Flash memory interfacing. Design exercises using development system.

CPE 504 Digital Signal Processing (Units: 3 LH 45)

Introduction: Advantages of digital over analogue signal processing, problems of digitization, overview of application of DSP, basic elements of DSP system. Digital Processing of analogue signals: Sampling of analogue signals, sampling theorem, aliasing, quantization, noise, and coding, types and selection of ADC/DAC, Sigma delta DC. Analytical tools: z-transform, properties, transfer function, inverse transform, z-plane poles and zeros, analysis of linear time-invariant in z-domain, system stability. Discrete Fourier Analysis: Discrete Fourier Transform and properties, inverse DFT, truncated Fourier transform, windowing, FFT algorithms. Discrete Time Signals & systems: Discrete time sequences (signals), classification and determination of discrete time system, discrete time i/o description (difference equation), solution of difference equations, convolution, correlation, impulse response. Digital Filters: Definition and types. FIR filters: Transfer function, characteristics, applications, design methods, Gibb's effect and elimination, fir filter realisation. IIR filter: Transfer function, characteristics, applications, overview of analogue filter design techniques, design methods-conversion from analogue to digital filter design techniques, IIR filter realization. Structure of Discrete Time System: Block diagram representation of constant coefficient difference equations, IIR and FIR systems and their basic structures, stability of discrete time systems. Software implementation of dsp algorithms. DSP Microprocessors: Architecture, fixed point vs. floating point DSP, Finite word length effects. DSP chips: interfacing and programming. Practical application of DSP in audio, and video.

CPE 506 Neural Network & Programming (Units: 2 LH 30)

Neural Network: Definition of artificial neural network. Similarities of neural network with human brain. Classification of ANN. Terminologies: input/output sets, weights, bias or threshold, supervised learning, network training, Convergence process, single layer vs. multilayer perception, Forward and Backward propagation, and gradient descent rule. Back-propagation neural network, Variable term used in back propagation neural network: learning rate, momentum, hidden nodes, sigmoid activation function. Backpropagation algorithm of ANN. Design of ANN model, training sets for ANN, test sets for ANN, network testing and performance. Engineering applications. ANN programming.

CPE 508 Computer Graphics & Animations (Units: 3 LH 45)

Overview of 3D animation and its application and types. Coordinate system, vertex, faces and object. Concept of wireframe, surface and solid modelling. Construction planes and differences between object space and world space. Principles of making characters alive. Polygonal Modelling techniques: the Box, using Edit Mesh, Smoothing Techniques, Subdivision Surfaces. Nurbs Modelling techniques: Utilizing NURBS toolbox, surface points and CVs. Importing and attaching NURBS surfaces, rebuilding surfaces, curve and surface approximation. Graphic animation process: Camera &nimation Camera, Set & Background (Image Plane), Light Linking.

Animation Techniques: Walk Cycle and Facial Expression using Blend Shape. Dynamics animation: Rigid Bodies, Soft Bodies, constraint, Particles. Tips and tricks on rendering. Concept of Rendering in 3D modelling. Ender options and file output.

CPE 510 Digital Image Processing (Units: 2 LH 30)

Introduction: definition, problems, and applications of digital image processing. Digital image acquisition devices. Digital image formats. Edge detection techniques, segmentation methods. Image Morphology. Image enhancement. Image restoration techniques. Morphology. Fourier transform and Wavelet transform in image processing. Image registration techniques. Shape analysis. Image understanding. Artificial neural network and image understanding. Colour representation standards, equations, processing, quantization, and dithering. Case study: practical application of image processing to face recognition, fingerprint, iris, etc. Introduction to image compression techniques, systems.

CPE 512 Robotic & Automation (Units: 2 LH 30)

Robot classification and manipulation. Technology and history of development of robots. Applications. Direct and inverse kinematics: arm equation. Workspace analysis and trajectory planning. Differential motion and statics. Manipulator dynamics. End-of arm tooling. Automation sensors. Robot vision. Work-cell support systems. Robot and system integration. Safety. Human interface. Robot control system. Circuit and system configuration. Task oriented control. Robot control programming. Fuzzy logic and AI based robot control. Fundamentals of automation. Strategies and economic consideration. Integration of systems. Impact to the production factory. Evaluation of conventional processes. Analysis of automated flow lines. Assembly systems and line balancing. Automated assembly. systems. Numerical control and adaptive control. Robot applications. Automated materials handling and storage systems. Automation in inspection and testing. Linear feedback control system. Optimal control. Computer process control. Computer integrated manufacturing systems. Future automated factory.

CPE 514 Design & Installation of Electrical & ICT services (Units 3 LH 45)

Electrical Installation: Introduction to Health and safety at work act in Nigeria. Electrical safety. First aid. Electricity supply regulations. Lighting and Illumination: Luminous intensity and flux. Maintenance factor. Coefficient of utilization. Types of light sources. Calculation of lighting requirements. Glare. Stroboscopic effect. Installation Materials, cables, junction box, terminations, joints. Conduits and conduiting. Truck and trucking. Electrical Installation design in domestic, commercial and industry. Alarm and emergency systems. Earthling and Protection. Purposes of earthing. Faraday cage. Rod electrodes. Earth electrode resistance. Earthing system. Earth fault loop impedance. ICT services: NCC and FCC codes of practice and standards. Telecommunication design and installation: Satellite, VSAT, etc. Telephone design and installation. Computer networking design and

installation. Wireless LAN design and installation. Preparation of Bill of Engineering Measurement Evaluation. Contract bidding. Consultancy.

GET 502: Engineering Law (2 Units: LH 30) Common Law:

Its history, definition, nature and division. Legislation codification interpretation. Equity: Definition and its main spheres. Law of contracts for Engineers: offer, acceptance, communication termination. General principles of criminal law. Law of torts: definition, classification and liabilities. Patents: requirements, application, and infringement. Registered designs: application, requirements, types and infringement. Company law. Labour law and Industrial Law

19. UNIVERSITY COMPULSORY COURSES

100 Level

First Semester

Course Code	Course Title	Credit Units
GST 111	Communication in English	2
GST 113	Nigerian Peoples and Culture	2
GST 115	History and Philosophy of Science	2
GST 121	Use of Library, Study Skills and ICT	2
GST 171	Ethics I	1

Second Semester

Course Code	Course Title	Credit Units
GST 112	Communication in English II	2
GST 122	Logic, Philosophy and Human Existence	2
GST 124	Communication in French	2
GST 142	Community Service	1

200 Level

First Semester

Course Code	Course Title	Credit Units
GST 211	Basic Spiritual Theology	0
GST 221	Peace Studies and Conflict Resolution	2
GST 223	Introduction to Entrepreneurial Skills	2

Second Semester

Course Code	Course Title	Credit Units
GST 222	Business Creation and Growth	2

300 Level

First Semester

Course Code	Course Title	Credit Units
GST 311	Entrepreneurship Advanced Skills	2

19.1 Course Description of University Compulsory Courses

GST 111: English and Communication Skills I (2 credit units)
The course is designed to impart the communication skills in the medium of English. Emphasis is on introducing students to English for Academic purposes and specifically focuses on: Study skills and Study plans; Listening and Note taking; Speaking (sounds of English, stress, intonation and rhythm); Reading Skills and strategies such as skimming and scanning, SQ3R, KWL, CATAPULT, THIEVES, etc); Book review and Library skills. The concentration of this course is equipping students to develop appropriate listening, reading and study skills using the library as a major store house of acquiring knowledge. Thus, the following are emphasised: listening comprehension, determining main idea, note taking; reading comprehension – reading skills, determining main idea from reading, skimming and scanning; and use of library, including cataloguing systems, locating books and journals, lending/borrowing, reference materials, indexing and examination taking techniques as well as book review.

GST 112: English and Communication Skills II (2 credit units)
This is a continuation of GES 1011 (English and Communication Skills 1) that introduced students to the rudiments of English for academic purposes. The focus of this course is academic writing and information literacy skills. Broadly, the course covers the use of English for academic discourse, use of library skills with particular reference to information literacy skills for academic success. The use of English component seeks to equip students with the linguistic conventions and skills suitable for academic writing such as fundamentals of English language grammar related to the sentence; writing – planning, assembling and organizing outlines, unity, coherence, context, originality, mechanical accuracy, paragraph development, forms of writing including but not limited to narration, description, argumentation, exposition, summary, correspondences, speech writing, etc. The use of library segment seeks to expose students to skills and strategies for locating, retrieving, organizing, synthesizing, and publishing information within the ICT domain. Such exposure is to provide students with appropriate skills for constructive, creative and critical academic tasks in order to train independent learners who should take responsibility for their own learning. The information literacy component also focuses on various citation and documentation processes for academic writing.

GST 113: Nigerian Peoples and Cultures (2 Credits) (20:10:0) LTP
The concept of culture, Pre-colonial cultures and languages of Nigeria; Principles of kinship, descent and marriage in Nigerian cultures; Nigerian economic institutions; Nigerian political institutions; Education and development in Nigeria; Religion in Nigerian culture; Culture, environment and health practices in Nigeria;

GST 115: History and Philosophy of Science (2 Credits) (20:10:0) LTP
Scientific evolution of man: the history of science; classification; scientific methods. Science and the environment: terrestrial and cosmic life; ecology and types of habitat; climate and vegetation; Energy resources: fossil fuels, nuclear energy and renewable energy resources; the Nigerian energy reserves. Characteristics of living things; cell and tissue biology biochemistry and cellular metabolism, taxonomy of living things; heredity and evolution: Technology and technological evolution; Engineering technology and socio-economic development of Nigeria; the effect of adequate and stable electric power supply and satellite communication technology on the technological development of Nigeria; political and other constraints. The interaction between science and technology: Social implications of advances in Science and Technology: automated industrial plants; satellite technology; space technology; genetic engineering technology; weapons of mass destruction (WMD); and environmental pollution.

GES 121: Use of Library, Study Skills and ICT (2 credits) (20:10:0) LTP
Brief history of libraries; Library and education; University libraries and other types of libraries; Study skills (reference services); Types of library materials, using libraries resources including e-learning, e-materials, etc; Understanding library catalogues (card, OPAC, etc) and classification; Copyright and its implications; Database and resources; Bibliographic

citations and referencing. Development of modern ICT; Hardware technology; Software technology; Input devices; storage devices; Output devices; Communication and internet services; Word processing skills (typing, etc).

GST 122: Logic, Philosophy and Human Existence (2 credits) (20:10:0) LTP
The nature, definition and branches of philosophy; Philosophy and other disciplines; Nature of philosophical problems, Periods in the history of Philosophy; Philosophy and national development; national ideology and patriotism; Types of argument and reasoning. Symbolic logic, Inferences and biconditionals; Qualification theory

GST 124: Communication in French (2 credits) (20:10:0) LTP
Introduction to French, alphabets and numerals for effective communication (written and oral) and simple sentence construction based on communication approach. Comprehension and reading of simple texts.

GST 142: Community Service (1 Credit) (0:0:45) LTP
Civil works beneficial to the University community and its environs including but not limited to farming, road building and maintenance, landscaping, planting of flowers and hedges, grass-cutting and general cleaning of campus and its environs, concreting and laying of seating and footpath slabs.

GST 171: Ethics (2 credits) (20:10:0) LTP
Since theology does not restrict itself to spiritual matters alone but concerns itself with the entire human well being, the course therefore with reference to the social teachings of the Church, examines the efforts of the Church as also pastor of the material well being of human persons, with special emphasis on human dignity and rights.

GST 211 Basic Christian Theology (2 credits) (20:10:0) LTP
The course aim to lead the students into the nature of the spiritual life in a way that gives meaning and purpose to the spiritual exercises they perform. It studies the nature of theology as a systematic reflection on the meaning and content of Christian revelation and faith; various theological disciplines and their interconnectedness; meaning of spirituality; different aspect of spirituality- Biblical, Liturgical, Pastoral and African; rise and development of monasticism and modern Spirituality; Overview of the history of Christian spirituality; Christian virtues and universal application of charity, chastity, poverty and obedience, spiritual retreats.

GST 212: Business Creation and Growth (2 credits) (20:10:0) LTP
Concept of Business and New value Creation: Business planning process, Start up decision-what motivates people to begin new businesses, Opportunity search and identification, Legal issues at start up, Feasibility analysis of new ventures and new venture financing; Theories of Growth - An Overview: Concepts and reasons of growth, Challenges of growth, Strategies for growth external growth strategies, Franchising, Buy-in and Buy-out), Mergers and Acquisition;
Sources of Funds: Internal sources and external sources, Formal and informal sources, Efficiency in the use of resources; Marketing: Concept of marketing: Small and big business marketing, Marketing mix, Modern marketing tools; Ethics and Social Responsibility: The importance of ethics in business, Ethical behavior and practices in Nigeria, Community Development projects/welfare; New Opportunities for Expansion: E-commerce, E-business, E-trade; Managing Transition - From start up to growth: Content Personal disciplines, Learning, Decision making, Control.

GST 221: Peace Studies and Conflict Resolution (2 credit) (20:10:0) LTP
Basic Concepts in peace studies and conflict resolution; Peace as a vehicle of unity and development; Conflict Issues; e.g Ethnic/religious/political/economic conflicts; Root causes of conflicts and violence in Africa; Indigene/settlers phenomenon; Peace - building; Management of conflict and security. Elements of peace studies and conflict resolution; Developing a culture of peace; Peace mediation and peace keeping; Alternative Dispute Resolution (ADR). Dialogue /arbitration in conflict resolution; Role of international organization in conflict resolution, ECOWAS, African Union, United Nations, etc.

GST 223: Introduction to Entrepreneurship Skills (2 credits) (20:10:0) LTP

Introductory Entrepreneurial skills: Relevant Concepts: Enterprise, Entrepreneur, Entrepreneurship, Business, Innovation, Creativity, Enterprising and Entrepreneurial Attitude and Behaviour. History of Entrepreneurship in Nigeria. Rationale for Entrepreneurship, Creativity and Innovation for Entrepreneurs. Leadership and Entrepreneurial Skills for coping with challenge. Unit Operations and Time Management. Creativity and Innovation for Self-Employment in Nigeria. Overcoming Job Creation Challenges. Opportunities for Entrepreneurship, Forms of Businesses, Staffing, Marketing and the New Enterprise. Feasibility Studies and Starting a New Business. Determining Capital Requirement and Raising Capital. Financial Planning and Management. Legal Issues, Insurance and Environmental Considerations.

GST 311 Entrepreneurship Advanced Skills (2 credits) (20:10:0) LTP

Profiles of business ventures in the various business sectors such as: Soap/Detergent, Tooth brush and Tooth paste making; Photography; Brick making; Rope making; Brewing; Glassware production/ Ceramic production, Paper production; Water treatment/conditioning/packaging; Food processing/preservation/packaging; Metal fabrication; Tanning industry; Vegetable oil extraction; Farming; Fisheries/aquaculture; Plastic making; Refrigeration/Air-conditioning; Carving, Weaving; Bakery; Tailoring; Printing; Carpentry; Interior decoration; Animal husbandry etc. Case Study Methodology applied to the development and administration of Cases that bring out key issues of business environment, start-up, pains and gains of growth of businesses, etc. with particular reference to Nigerian businesses. Experience sharing by business actors in the economy with students during Case presentations.

19.2 **Graduation Requirement**

(a). Minimum number of Earned Credit hours for graduation: 162
(b). Minimum number of years for graduation: Four (4)
(c). Residency requirement: minimum of 4 years/maximum of 7 years.
(d). Minimum CGPA for graduation: 1.50/(Maximum: 5.00).

20. DEFINITION OF CONCEPTS

20.1 Academic/ Study Programme

An academic or study programme is a combination of courses prescribed by the Department to be taken in a progressive manner from 100 level to 500 level and must be completed in a minimum of eight semesters (4 years) and a maximum of fourteen semesters (7 years) leading to the award of a recognized qualification.

20.2 Courses

A course is a series of lectures on a particular subject as may be determined by the Department, lasting one semester and associated with a single or two examination paper(s). A course may last for more than one semester, provided that such a course is divided into two parts, either part of which carries equal credit weighting and lasts for only one semester and is examinable at the end of the semester.

Compulsory/ Core Course

This is a course which must be taken and passed by the student before graduation or such a student is deemed to have fully satisfied the conditions for successful completion of the programme. It may be a Departmental or borrowed course.

Elective Course

This is a course a student must select from the list recommended by the Department to be taken and passed for successful completion of the programme. A student has the liberty to make a choice provided the choice is within the Departmental recommended list.

20.3 Department

This refers to any teaching or research unit, institute, or any unit recognized by the University Council on the recommendation of Senate.

20.4 Faculty

This refers to a unit as constituted and established by the Senate and Council of the University usually consisting of two or more Departments.

20.5 Dean of Faculty

Refers to a person elected by the Department Board of Studies and approved by the Vice Chancellor to oversee the affairs of the Departments in the Faculty.

20.6 Head of Department
Head of Department (HOD) refers to the person appointed by the Vice Chancellor to oversee the affairs of the Department.

20.7 Academic Year/Session
This is normally a 9 month or 36-weeks period beginning in October of one year and ending in July of the next.

20.8 Semester
This is one half of an academic year; usually a duration of 18 weeks.

20.9 Year of Study
This refers to the year within the prescribed duration of study by which a student may be identified.

20.10 Academic Discipline
It refers to a special area of study normally domiciled in a department; for example, Electronic Engineering in the Department of Electronic and Computer Engineering.

20.11 Repeat Course / Examination
A repeat course/examination is a course/examination taken by a student who had failed a course and who must register and repeat lectures in a course after failing in the previous attempt(s).

20.12 Carry Over
A carry over course is a course which a student had registered for in a semester but owing to an overload has to be shifted to the next available opportunity.

20.13 Board of Examiners
This refers to all members of a Department or Department holding academic appointments above the rank of Assistant Lecturer and who taught courses.

20.14 Supplementary Examination
This is an examination taken by students who were unable to sit a particular examination on account of ill-health or any other accepted reasons. The examination must be taken at the next available opportunity. Such a student is credited with the full marks so earned.

20.15 Pass Grade
A grade within the range A-D

20.16 Fail Grade
A grade of E and F.

20.17 Concurrent Course
A course-listed between two or more departments

20.18 Good Standing

This refers to a student whose CGPA is not less than 1.50 at the end of each year of study.

20.19 Probation

It is a period (session) in which a student whose CGPA at the end of the session falls below 1.50 is given to improve upon.

20.20 Withdrawn

It is the compulsory termination of studentship in a programme when a student's CGPA falls below 1.50 after probation.

20.21 Withdrawal

This is the voluntary termination of studentship at the student's volition for whatever reason.

20.22 Grade Point (GP)

The Grade Point derives from the actual percentage raw score for a given course; the raw score is converted into a letter grade and a grade point

20.23 Grade Point Average (GPA)

This is average of weighted grade points earned in the courses taken during the semester. The Grade Point Average is obtained by multiplying the grade point attained in each course by the number of Credit Units assigned to that course, and then summing these up and dividing by the total number of Credit Units taken for the semester. The GPA is used to report the academic performance of each student in a semester.

20.24 Cumulative Grade PointAverage (CGPA)

This is the up-to-date mean of the Grade Points earned by the student in a programme of study. It is an indication of the student's overall academic performance at any point in the training programme. To compute the cumulative grade point average, the total of the grade points multiplied by the respective Credit Units for all the semesters are added and then divided by the total number of credit units for all courses registered by the student.

20.25 Credit Units

Credit Units consist of specified number of student – teacher contact hours per week per semester. Credit units are used in two complementary ways, one, as a measure of course weighting and the other, as an indicator of student workload.

20.26 General Examination Regulations

A. Requirements for taking examination

In order to be admitted to a University examination, the student MUST:

i. have duly registered for the course
ii. follow the approved course of study for a prescribed period
iii. have paid all prescribed fees by Senate as and when required
iv. satisfy 80% attendance at lectures
v. Comply with any additional requirements approved by Senate from time to time.

B. Organization of Examination

i. Each Faculty /Department shall be responsible for the organization and conduct of examinations for all courses taught in the Faculty /Department.
ii. Each Department shall appoint an examination officer who shall be responsible for preparing timetable, arranging for invigilation, and other requirements necessary for conducting all examinations in the Department. The responsibility for supervision of examinations shall rest with the Head of Department as the Chief Examiner for the Department.
iii. The Sub-Dean of the Faculty shall be the Faculty Examination Officer. The Faculty Examinations Committee shall consist of each departmental examination officer with the Sub-Dean as Chair. The Committee shall be responsible for the coordination of timetables, physical arrangement of examination venues, invigilation and discipline in all examinations in the Faculty.

C. Scheduling of Examinations

Course examinations shall be scheduled at the end of the semester in which the teaching of the course is completed and on dates approved by Senate. If the University, for unavoidable reasons, is obliged to postpone an examination, the Registrar, in consultation with Deans of affected Faculty and the Director of Academic Planning shall re-schedule such examinations.

D. Duration of Examinations

i. The duration of written examinations shall normally be between two-three hours depending on the Credit units of the course.
ii. The duration for practical examinations shall be a minimum of three hours.

E. Examination Timetable

The Director of Academic Planning shall compile and publish a draft timetable for all University examinations at least four weeks before the commencement of each examination and a final timetable not later than two weeks before the commencement of the examinations.

F. Setting and Administration of Examination Questions

i. Each Lecturer teaching a course shall submit questions to the Head of Department at least two weeks to the examination date.
ii. The Chief Examiner will in turn arrange for the moderation of the questions.
iii. The Head of Department shall ensure that all results of the courses examined are collated by all the examiners of the courses and submitted along with answer scripts, attendance register and marking scheme(s) two weeks after the examination as approved by Senate.
iv. The Head of Department shall be held responsible for any lapses arising from teaching, examination, preparation and submission of results as and when due as approved by Senate.

G. Invigilation of Examination

For each examination, there shall be a chief invigilator provided he/she is not the course lecturer of the said course. The course lecturer shall be available as an assistant examiner.

H. Duties of Invigilators

The chief invigilator shall

i. Collect examination answer booklets and question papers from the Dean of Faculty
ii. Maintain an attendance register which shall be completed and lodged with the Dean of Faculty at the end of the examination

iii. Receive from invigilators, report on any misconduct observed or suspected and in turn report the same to the Dean of Faculty after the examination
iv. Deposit answer scripts with the Head of Department immediately after the examination
v. Ensure that:
   - Within the first 30 minutes of the examination, no candidate leaves the examination room except on cases of emergency
   - After the first 60 minutes of the examination, no candidate enters the examination room
   - During the last 15 minutes of the examination, no candidate leaves the examination room.

I. Administration of Examination

1) Conduct

i. Students shall be at the examination venue at least 30 minutes before the advertised time for the examination. Students MUST BE PROPERLY DRESSED before entering the examination room.
ii. Students must produce their identity card on entry to every examination and display them conspicuously throughout the duration of the examination. It shall be the duty of the invigilator (s) to ensure that students write their names, registration numbers and other required information in the attendance register
iii. Students shall complete all information required of them in the answer booklets including continuation sheets
iv. The scripts of students who leave the examination room during emergency must be retrieved by the Invigilator before the student leaves the room.
v. The Invigilator shall arrange the answer scripts in labelled envelopes and submit same to the Chief examiner or course coordinator 30 minutes after the completion of the examination. It shall be the responsibility of the Chief Examiner or Course Coordinator to collect and confirm the number of scripts received from the Chief invigilator.

2) Misconduct

i. Obstructing any invigilator or any other examination official in the performance of his/her duties, thereby causing harm or damage
ii. Impersonation (writing examination for another)
iii. Destroying evidence/exhibits by chewing or by any other means or an attempt to do same
iv. Use of scripts other than those designated for an examination
v. Use of answer booklet consisting mainly of loose or continuous sheets
vi. Bringing into the examination hall any unauthorized materials/gadgets relevant to the examination being taken
vii. Copying with or without cooperation
viii. Presentation of identical responses to the same question by two or more students even in cancellation
ix. All forms of communication during examinations (passing papers or dropping papers, conscious or unconscious)
x. Appearance of different handwritings in a student's scripts
xi. Courier (smuggling of examination question papers out of the examination room
xii. Reading of notes/textbooks in the rest room during the examination or under any guise
xiii. Falsification of test or examination marks/grade
xiv. Failing to sign in examination misconduct form when caught cheating in an examination
xv. Plagiarism: Copying and downloading other people's work for the project or assignment.

Invigilators shall endure that affected students complete the examination misconduct form for all established cases of misconduct. Such students shall be allowed to continue with the examination after documenting the misconduct accordingly.

J. Procedure for Handling Examination Misconduct

i. The student is made to state and sign the examination misconduct form with his/her own version of the case. Thereafter, the student is allowed to continue to write that examination using another answer booklet. The form should be counter-signed by a student witness if available. In the case the student refuses to sign the misconduct form, the security unit will be invited to remove the said student from the examination hall.
ii. The alleged offender's answer booklet will be retrieved by the Chief Invigilator and stapled to the signed form for onward transmission through that student's department to the Examination Misconduct Committee. The latter will then decide the level of the misconduct committed and the corresponding penalty.
iii. The penalty ranges from cancelling of the student's paper to rustication for one year.
iv. The Chief Invigilator should write a report packaging the defaulter's booklet to be forwarded to the Examination Misconduct Committee for appropriate action.

K. Appointment and Duties of the Examination Officer

1) Appointment

Each department shall appoint an Examination Officer not below the rank of Lecturer 1. The appointment is for two academic sessions, subject to reappointment for another period of two years. The Head of Department, through the Dean of the Faculty applies to Senate for approval of the appointment after which the Registrar issues a letter of appointment.

2) Duties

It is the duty of the Examination Officer to

i. Prepare the timetable, arranging for invigilation, and other requirements necessary for conducting all examinations in the Department
ii. Prepare a summary result sheet for all students registered in the department

L. Duties of Examiners

1) Internal Examiners

Internal examiners are Lecturers who taught a course and set the examination questions on the course. Their duties include:

i. Setting and participation in the moderation of examination questions in the department
ii. Invigilating all examinations of the courses they teach
iii. Grading all examination scripts of the courses they taught and submitting the grades to the Head of Department
iv. Taking part in the meeting of the Department Examiners' Board to consider and approve results for submission to the Faculty Examiners' Board

2) External Examiner

An External Examiner is a senior academic appointed by the University who is currently not serving in the University. Usually those appointed are proven academics with a known track record in an appropriate area of specialization in the department for a period as may be determined by Senate. The duties of the External Examiner include:

i. Moderation and vetting of the course outlines for all final year courses
ii. Moderation and vetting of all the examination questions as well as answer scripts of all final year students
iii. Moderation and vetting of final research projects/long essays
iv. Resolving any conflict in grades for final year students
v. Vetting of final year grades and final degree of pass
vi. Writing a report covering aspects of his/her moderation/vetting

M. Appeals for Re-assessment of Examination Scripts

i. Students may appeal to the Registrar through their Head of Department and the Dean of the Faculty for re-assessment of their examination scripts on payment of a fee as stipulated by Senate
ii. Appeals for the re-assessment of the scripts can only be made by the student(s) concerned
iii. Group appeals by all candidates involved in a particular examination cannot be entertained
iv. If the appeal results in significant improvement (change in letter grade) on the student's original grade, the appeal fee shall be refunded to the appellant.

For an appeal to be valid, notice in writing by the student to the Head of Department must be lodged with the Registrar within four weeks of the publication of the relevant results.

The re-assessor must not be known to the aggrieved student

The re-assessor shall be furnished with the following:

i. Two scripts whose scores are around the petitioner's score
ii. The petitioner's script
iii. The marking scheme used to assess the script(s) by the course lecturer.

There should be no indication to the re-assessor which script(s) require(s) special attention. After the exercise, only the petitioner's scrip(s) will be affected by any change in grade while the other script(s) retain(s) their original grades.

Veritas University, Abuja

Faculty of Engineering

Department of Electronic and Computer Engineering

Attestation to Department of Electronic and Computer Engineering, Faculty of Engineering Student Handbook.

Engineering students are required to read Veritas University, FCT, Department of Electronic and Computer Engineering Handbook and affix his/her signature to attests that the student has read and understood the printed or online version, has no further questions on the handbook, agrees to all stated instructions, and will take responsibility for all action while enrolled in the Department.

Names *Surname First*	**Matriculation No.**	**Signature**	**Date**