ELIZADE UNIVERSITY, ILARA-MOKIN,ONDO STATE

DEPARTMENT OF INFORMATION COMMUNICATION ENGINEERING

Handbook for Undergraduate Programme
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Note: The Information contained in this handbook is accurate and up-to-date at the time of publication. However, the matters covered are subject to change from time to time. The Department will publish such changes, if there are any, in the next edition of the handbook.

Engr. Prof. Oluseye ADELEKE, Ph.D
DEAN, Faculty of Engineering

Engr. Prof. Adeleye Samuel FALOHUN, Ph.D.

Head, Department of Information and Communication Engineering

Preface

The departmental handbook provides information to prospective and registered students on programme of studies offered by the Department of Information Communication Engineering, Elizade University, Ilara - Mokin, Ondo State, Nigeria. It is hoped that the information would assist students to derive maximum advantages from the opportunities and facilities available in the Department and the University in planning their academic programmes.

The currently available five-year engineering degree programme is built on a common foundation of basic studies, comprising Mathematics, Basic Sciences, Engineering Sciences and General Studies. The programme is designed to facilitate specialization while allowing opportunities for taking approved courses from other areas. The programme is also fashioned to allow the prospective engineer graduate to have appropriate technical expertise and human perspective.

The Department of Information Communication Engineering, Elizade University, Ilara - Mokin, Ondo State, Nigeria issues this handbook as a general guide to its courses and facilities. It forms no part of a contract. The department reserves the right to modify or alter without prior notice any of the contents herein, subject to substantive regulation of the University.

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DEAN, Faculty of Engineering

Engr. Prof. Oluseye ADELEKE
B.Tech, M.Sc, PhD (Ogbomosho)
COREN (R.19857)

Faculty Officer

***Mrs. Blessing* AGHAUKWU**

HEAD OF DEPARTMENT

Engr. Prof. Adeleye Samuel FALOHUN
B.Tech, M.Sc, PhD (Ogbomosho)

1. MISSION AND VISION OF THE UNIVERSITY

1.1 The University's Mission

To produce graduates with the appropriate skills and knowledge for the development of the nation and global competitiveness.

1.2 The University's Vision

Elizade University seeks to be a globally competitive institution that produces entrepreneurial, innovative and ethical graduates.

1.3 The University's Strategic Objectives

The strategic objectives of the University (Elizade University, Ilara-Mokin) are to:

a. produce graduates of international standard, with adequate knowledge and skills in their field of study, who will be highly employable and self-reliant;
b. provide high quality research and development activities that will promote the development of the Nation and enhance the image of the University and the researchers;
c. harness modern technology especially ICT and modern social, economic and financial strategies to run a cost-efficient and effective academic programme and institutional management;
d. provide services that are relevant and impactful to the local community and the Nation;
e. provide conditions of study, work and living in the University Community that are of appropriate standards;
f. expand access to tertiary education in the face of unmet demand; and
g. operate as an equal opportunity educational institution, sensitive to the principle of gender equity and non-discriminatory based on race, ethnicity, religion or physical disability.

2. GENERAL INFORMATION TO STUDENTS

2.1 History and Location of the University and the Programme

The Elizade University is located in lIara-Mokin in Ondo State of Nigeria. The State was created on 3 February 1976 from the former Western State. It originally included what is now Ekiti State, which was carved out of Ondo State in 1996. Akure is the State capital. The State lies between Longitudes 4° 30' and 6' East of the Greenwich Meridian, 5° 45' and 8° 15' North of the Equator. This means that the State lies' entirely in the tropics. Ondo State is bounded in the North by Ekiti and Kogi States; in the East by Edo State; in the West by Oyo and Ogun States; and in the South by the Atlantic Ocean. The State has a land area of 14,788.723 Square Kilometers. The State has a population of 3,441,024 comprising 1,761,263 males and 1,679,761 females.

Elizade University emphasizes learning, research and development. Having completed all due processes, approval for the establishment of Elizade University was given by the Federal Government on 22 February, 2012. The approval was conveyed vide the Provisional License to Operate as a Private University No. 46 dated 28 February, 2012 issued by the National Universities Commission. Elizade University aims to attract the best and the brightest students in Nigeria and beyond. The main aim is to provide them with practical-oriented scientific, technological and arts education which shall make them self-reliant while preparing them for future leadership and success in their chosen careers in the highly competitive new knowledge society. Academic activities of the Elizade University started at 2012/2013 session (6th January, 2013). The Engineering Faculty at the Elizade University commenced in September, 2013 during the 2013/2014 academic session.

The Department of Information Communication Engineering took-off in the 2013/2014 academic year with five students. As one of the pioneer departments in the Faculty of Engineering, The department commenced academic activities at the beginning of 2013/2014 academic session. Currently, 19 students are enrolled in its full-time Bachelor of Engineering (ICT Engineering) programme.

2.2 Roll of Honours for Students

Senate decided that Roll of Honours for Students be instituted in the University to enhance discipline and good performance among students. All students are enjoined to strive to be on the Honours Roll. The Details of the honours roll are as follows:

The beneficiaries must the minimum required CGPA and the beneficiary must maintain this grade annually to continue to enjoy the award. The recommendations must be processed along with results of second Semester Examinations. Student must be of good conduct. He or she must not have

outstanding or carry-over courses and must not be repeating the year. Nostudent on Leave of Absence shall enjoy the Annual Roll of Honours Award. No student that has adisciplinary problem shall enjoy the award. The award shall be based on the recommendation of the Department Board of Examiners and the Faculty Board of Examiners. Each beneficiary shall be given a certificate and scholarship.

The Honours Roll shall be at three levels as follows:

a. Founder list : for suitably qualified candidate with a minimum CGPA of 4.50 on a basis of 5.00
b. VC list: for suitably qualified candidate with a minimum CGPA of 4.20 on a basis of 5.00, and
c. Dean's list: for suitably qualified candidate with a minimum CGPA of 4.00 on a basis of 5.00

2.3 Information on Division of Students' Affairs

Information on students' welfare can be summarized as follows:

a. **Guidance and Counselling Unit:** The Division of Student Affairs has Professional Counsellors who are committed to helping students grow in self-understanding in the Process of integrating their personal and academic experiences. The Services are .free to students and are confidential (not used as part of his/her other University records). The services include personal Counselling, group counselling, study skills improvement, tests anxiety reduction, personal crisis intervention, psychological testing, career and occupational counselling and settlement of grievances between students, where necessary, consultations are made with campus organizations, sound academic Departments, to ensure that students' problems are resolved satisfactorily. The Counsellors can be contacted on the ground floor of the Senate Building;
b. **Scholarship and Financial Assistance:** The Division of Students' Affairs serves as a link between students and Sponsoring authorities, both within and outside Nigeria. Students are to check the Notice Boards in their respective faculties as well as those at the Division of Student Affairs Building for advertisements and other relevant information. Liaison is also maintained between students and governments at various **l**evels for scholarship and bursaries.

2.4 Information on the University Library

Membership of the Library is available, on completion of a registration card, to all students,

members of the senior staff of the University and such other persons as may be determined by the Library Committee or the University Librarian on behalf of it. Students are required to renew their registration at the beginning of each academic year. Library cards and borrower's tickets are not transferable; books issued on them remain the responsibility of the person whose name appears on them. A lost library card or borrower's ticket may be replaced on submission of a written application.

2.5 Disciplinary Measures

(i) Examination Offences

(a) A candidate shall not be allowed during an examination to communicate by word or otherwise with any other candidate nor shall leave his place except with the consent of an invigilator. Should a candidate act in such a way as to disturb or inconvenience other candidates, he shall be warned and if he persists, he may, at the discretion of the invigilator, be excluded from the examination room. Such an action by the invigilator must also be reported in writing through the Head of Department to the Vice Chancellor within 24 hours.

(b) It shall be an examination offence for any student, staff or any person whatsoever to impersonate a candidate in any University examination. Any student or staff of the University found guilty under this regulation shall be subjected to disciplinary action by the appropriate authority of the University. The candidate impersonated shall also be liable to an infraction of this regulation where it is established directly from circumstantial evidence that the impersonation is with his knowledge or connivance.

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

(d) Mobile phones are not allowed in examination halls.

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

(f) Candidates shall comply with all “direction to candidates set out on an examination answer book or other examination materials supplied to them. They shall also comply with direction given to them by an Invigilator.

(g) Candidates shall not write on any paper other than the examination answer booklets. All rough work must be done in the answer booklets and crossed out neatly. Supplementary

answer booklets, even if they contain only rough work must be tied inside the main answer booklet.

(h) When leaving the examination room, even if temporarily, a student shall not leave his written work on the desk but he shall hand it over to an Invigilator. Candidates are responsible for proper return of their written works.

(i) Smoking shall not be permitted in examination room during examination sessions.

(j) Any candidates or staff who attempts in any way to unlawfully have or give pre-knowledge of an examination question or to influence the marking of scripts or the award of marks by the University examiner shall be subjected to disciplinary action by the appropriate authority of the University.

(k) If any candidate is suspected of cheating, receiving assistance or assisting other candidates or infringing any other examination regulation, a written report of the circumstance shall be submitted by the invigilator to the Vice Chancellor within 24 hours of the examination session. The candidate concerned shall be allowed to continue with the examination.

(l) Any candidate suspected of examination malpractice shall be required to submit to the invigilator a written report immediately after the paper. Failure to make a report shall be regarded as a breach of discipline. Such report should be forwarded along with the invigilator's report to the Vice Chancellor.

(m) Where a Head of Department fails to forward a report on examination malpractice to the Vice Chancellor, such action would be considered as misconduct.

(n) Where the Vice Chancellor is satisfied on the basis of the report forwarded to him that any candidate has a case to answer, he shall refer the case to the Central Committee on Examination Malpractices.

(ii) Penalties for Examination Malpractices and other Offences

(o) Any examination offence would attract appropriate penalty including outright dismissal from the University.

(p) Where the Vice Chancellor has reason to believe that the nature of any question or the content of any paper may have become known before the date and time of the examination to any persons other than examiners of the paper, the Board of Examiners and any official of the University authorized to handle the paper, he may order the suspension of the examination or the cancellation of the paper or setting of a new paper and shall report the matter to the Senate. The Vice Chancellor shall also take any disciplinary measure against any student or students involved as he may deem appropriate.

(q) If in the opinion of an invigilator, circumstances arise which render the examination unfair to any candidate, he must report the matter to the Vice Chancellor within 24 hours after the examination. Where such matter is reported to the Vice Chancellor he may take such action as he deems fit. If he directs that another examination be held, that examination shall be the examination for the purpose of this regulation.

(r) Any candidate or member of staff may complain to the Vice-Chancellor that an examination has been improperly conducted. The Vice-Chancellor shall investigate the complaint and report the results of his investigations to the Senate which shall take such action as it may deem appropriate, including with-holding a result or deprivation of the award of a degree, diploma etc. as laid down in her Statues. However, where it is shown to the satisfaction of the Committee of Deans that any alteration or amendment of a University regulation involving a change in a course of study or in examination requirements has caused hardship to a candidate in any examination, the Committee of Deans shall make such provisions as it thinks fit for the relief of such hardship and report same to Senate.

2.6 Degree Programme

Bachelor of Engineering in Information Communication Engineering (B. Eng. Information Communication Engineering)

2.7 Members of Staff

S/N	Names	Discipline	Area of Specialisation	Qualifications	Rank	Employment Status	Mode of Employment
1	Engr. Prof. FALOHUN Adeleye Samuel		Pattern Recognition, Computer Security/Biometrics, Control Systems and Artificial Intelligence	B.Tech, M.Sc, PhD (Ogbomosho)	Professor	Full Time	Sabbatical
2	Prof. ASERE Abraham	Mechanical Engineering	Energy Engineering, Thermofluid and Combustion Engineering	B.Sc., Ph.D. (University of Leeds, UK), AMIE, AMIP, MSAN, MCREN, LMNSE, FSESN, FNIMechE, FAutoEI, COREN	Professor	Full Time	Associate

				(R.4456)			
3	Prof. ADELEKE Oluseye	Electronic and Electrical Engineering	Communication Engineering	B.Tech. M.Sc, PhD (Ogbomosho), COREN (R.19857)	Professor	Full Time	Associate
4	Engr. Dr. OGIDAN Olugbenga Kayode	Electrical/ Electronic Engineering	Computer Security, Networking and Intrusion Detection.	B.Eng. (Ado Ekiti), M.Eng. (Akure), D.Tech (Cape Town), MNSE, COREN (R.20748) MCPN.	Senior Lecturer	Full Time	Associate
5	Dr. OLURANTI Abiola	Mechanical Engineering	Ergonomics, Mechanical Production and Materials Engineering.	B.Sc. MSc. PhD. (OAU) MNSE, COREN (R.35630)	Senior Lecturer	Full Time	Associate
6	Engr. Dr. AFOLABI Olaitan O.	Computer Engineering	Secure Computing, Artificial Intelligence, Machine Learning, Pervasive Computing, Wireless Communication	B. Tech (LAUTECH); M.Sc. (OAU) COREN (R.17989), MNSE, MBCS, MIEEE, MNCS, OWSD	Lecturer I	Full Time	Full Time
7	Engr. Dr. AMODU Oluwatosin A.	Information and Communication Engineering	Wireless communications, machine-to-machine communications, cognitive radio networks, interconnection networks, Unmanned aerial vehicles, Terahertz communication	B.Eng. (Akure), MSc (Malaysia), PhD (Malaysia). COREN (R70712)	Lecturer I	Full Time	Full Time
9	Engr. SHOBOWALE Yusuf I.	Computer Engineering	Wireless Communication and Security, Renewable Energy, Blockchain Technology, Internet of Things,	B.Tech (LAUTECH); M.Sc (OAU), COREN (R.68176), MNSE, (56184), MNIEEE, MNIICTE	Lecturer II	Full Time	Full Time
10	Engr. UWADIA Anthony	Electrical and Electronics Engineering (	Machine Learning and Artificial Intelligence	B. Tech, M. Tech (FUTA) COREN	Lecturer II	Full Time	Full Time

		Communicati on Option)		(R.71405)			

LIST OF EXISTING TECHNICAL STAFF FOR THE INFORMATION AND COMMUNICATION ENGINEERING PROGRAMME

S/N	Name	Discipline	Area of Specialisation	Qualifications	Rank	Employ ment Status	Mode of Appoin tment
1	AJIBOYE Kayode M.	Computer Engineering	Information and Communication Engineering	HND (Ede) NATE (C-12085)	Technologist I	Full time	Full Time
2	ABIODUN Bunmi J.	Electrical/Electroni c Engineering	Electronics and Telecommunication	HND and PGDE	Technologist II	Full time	Full Time

LIST OF EXISTING ADMINISTRATIVE STAFF FOR THE INFORMATION AND COMMUNICATION ENGINEERING PROGRAMME

S/N	Name	Discipline	Qualification	Rank	Employment Status	Mode of Appointment
1	Miss CHUKWU Chidinma	Secretariat Studies	HND, Secretariat Studies (Ebonyi)	Confidential Secretary	Full time	Full Time
2	Mr. ADEKUNLE Oluwatimilehin	Accounting	ND Accounting (Ondo)	Executive Officer	Full time	Full Time

3.0 PROGRAMME PHILOSOPHY

In the Department of Information Communication Engineering, students are trained for the award of Bachelor of Engineering (B.Eng.) degree in Information Communication Engineering. The teaching and research are based on sound academic foundation as well as practical orientation that will be sufficient to make them employable in industries.

The philosophy of the programme is to produce graduates that combines sound theoretical background with practical skills to enable them take up challenging positions in the Information Communication Technology and manufacturing industries, public service and the academia directly and also to reach a level of practical sufficiency that would enable them to be self-employed.

3.1 Career Opportunities

Information and Communication Technology (ICT) professionals conduct research, plan, design, write, test, provide advice and improve information technology systems, hardware, software and related concepts for specific applications. Opportunities abound for them as Technical Supports who typically handles both hardware and software issues at the user level, helping out the less tech-savvy with their computer problems making communication skills, problem solving, and well-rounded tech knowledge an asset. **Computer programmers** are the brains behind software functions – they write and test the code that makes up software programs. **Web developers** are the ones who are responsible for building websites and infrastructures behind them making a careful balance of creativity and technical prowess a must for those looking to join this area of information technology. Computer systems analysts are the multitaskers of information technology; they have to understand computer hardware, software, and networks – and how they all come to work together. **IT Security experts** who involve in implementing and running security software, scanning for abnormalities, upgrading systems, and keeping their companies informed of the risks involved in daily activities. **Network engineers** have *a lot in their plate* with respect to the duties they perform – they are in charge of setting up, administering, and maintaining and upgrading local and wide area networks for an organization.

4.0 PROGRAMME OBJECTIVES

The objectives of the programme are to produce engineering graduates:

(i) with broad knowledge of information communication technology, and in-depth knowledge of its specialties;

(ii) that can apply scientific principles to the design and maintenance of information communication technology devices;

(iii) that are socially, morally and legally responsible;

(iv) with good understanding of economics, management and marketing principles that are essential for the information communication technology industry; and

(v) who are creative and innovative, and can readily develop their entrepreneurship skills and technical competence, to be self-employed in consultancy, manufacturing, service and ICT industry;

(vi) that are sufficiently practical-oriented to be self-employed.

5.0 ADMISSION REQUIREMENTS

Admission into the programme is either through Unified Tertiary Matriculation Examination (UTME) into 100-level or Direct Entry into 200-level.

A. Unified Tertiary Matriculation Examination (UTME)

Admission into 100 Level is through the UTME of the Joint Admission Matriculation Board in English Language, Mathematics, Physics and Chemistry. To be eligible for admission, candidates must have a minimum of five credit pass in the General Certificate of Education (Ordinary Level) or West African Senior Secondary Certificate Examination (WASSCE) or NECO or IJMB or its equivalent at not more than two (2) sittings in the following subjects: Chemistry, Physics, Mathematics and English Language. In addition, candidate may also be required to pass a post-UTME examination conducted by the university, subject to subsisting government regulations.

B. Direct Entry

In addition to the requirements specified above in (A), candidates seeking admission to 200 level must possess either of the following.

i. National Diploma (ND) at Upper Credit Level or equivalent in Information. Communication Technology or Computer Engineering or related discipline from recognised institutions.

ii. Good passes at the General Certificate of Education (Advanced Level) or its equivalent in Chemistry, Physics and Mathematics.

6.0 PROGRAMME DURATION

The minimum duration of the programme is five academic sessions for students admitted to 100 - level through the UTME and four academic sessions for those admitted into 200 - level by Direct Entry, under the course unit system. Students may take longer than the minimum of academic sessions to complete the requirement for graduation but **NOT** more than 15 semesters for UTME entrants and 12 semesters in the case of Direct Entry students. Longer duration is subject to the approval of the university.

6.1 Transfer within the University

If a student transfers from one Faculty to another, the transfer would be treated as if he/she is just being admitted into the University. As part of the requirement for graduation, the student has to take all the foundation/compulsory courses in the new Faculty or Department. In that case, his/her stay in the new Faculty or Department should be 1.5 times the number of semesters required to complete a programme.

- Where a student transfers from a science-based Faculty to another, the computation of his result in the new Faculty shall take cognizance of his previous CGPA in the new Department. The duration of the stay in the University will be what remains of the 1.5 times the number of semesters required to complete the programme as approved by Senate.
- Where a student is transferring from an Engineering, science-based to Humanities, arts-based Faculty or vice-versa, the transfer shall be treated as if the student is just being admitted into the University. The GPA of the student will not be transferred to the new Department. He or She will, however, be required to take all the foundation or compulsory courses in the new Department.

7.0 GRADUATION REQUIREMENTS

To be eligible for a degree of B.Eng. in Information and Communication Engineering of Elizade University Ilara-Mokin, a candidate must:

- pass all prescribed core courses as well as university and faculty required courses and electives;
- complete a minimum of 193 units if admitted through UTME and a minimum of 164 units, if by Direct Entry and obtain a CGPA of not less than 1.5; and
- complete successfully all field projects, laboratory practicals and industrial attachments. Direct Entry students are expected to register and pass the General Studies Courses required by the university, i.e., GST 101, 102, 104, 105 and 106. In the event that they fail these courses, they must offer them formally as credit courses.

8.0 The Course Unit System and Computation of Cumulative Grade Point Average [CGPA]

The course units in the Department are organized on the course credit system per semester. A semester lasts for approximately 17 weeks, including the periods of registration and examinations, provided that not less than 14 weeks are devoted to actual teaching (Appendix A). One credit unit is the equivalent of 15 contact hours of classroom teaching or 30 hours of laboratory work. Most of the course units in the Department carry the weight of 2 or 3 credit units, suggesting that they are taught for 30 or 45 hours in the semester or 2 or 3 one-hour periods per week. In courses with practical component, this means that there are 15 hours of teaching and 45 hours of practicals to qualify for 2 credit units or 30 hours of teaching and 45 hours of practical for 3 credit unit courses.

However, there are fewer 3 credit unit courses which suggest that more work is required to be done in 45 contact hours per semester or the equivalent in terms of practical and classroom teaching. At the end of each semester, a final examination is given to bring the course to final conclusion. The final examination in each course unit is weighted 60% of the component. Usually, 2 continuous assignment (CA) per course unit carries the weight of 40% of total marks for the course. No student can pass in a course unit if he/she fails to submit the CA assignments.

8.1 Pattern of Examination

Each course shall be examined at the end of the course. The examination shall be conducted as prescribed by the Senate. Each examination shall be 1-3 hours in duration. In addition, there may be a practical paper and/or an oral examination. There shall be continuous assessment of each course and

this shall constitute a percentage of the formal grade.

8.2 Eligibility for Participation in Examination

All students who are registered for a course in a given semester are eligible to sit for examination in that course EXCEPT for students in the following categories.

(a) A student who fails to attend 75% of lectures or practicals in the course.

(b) A student who is absent from the university for one semester without any official notification and permission. Such a student is deemed by the Senate to have withdrawn from the university.

The implementation of the cases listed above is subject to Senate's approval on the recommendation of the faculty board.

8.3 Measurement of Performance

Performance in a course shall be measured in terms of the following.

a. The results of prescribed theory and practical examination;
b. Continuous assessment which shall constitute 40% of measured performance; and
c. Assessment of such essay, practical exercises and reports prescribed for each course.

8.4 Level of Performance Rating

A student shall be recorded as having attained a level of performance in a course as follows:

Level of Performance	Rating	Credit per Unit
A	70% - 100%	5 (Excellent)
B	60% - 69%	4 (Very Good)
C	50% - 59%	3 (Good)
D	45% - 49%	2 (Satisfactory)
E	44% - 40%	1 (Adequate)
F	0% - 39%	0 (Failure)

Based on the above, a student who obtained a grade of "A" in a 4-unit course has scored 20 credit points, and one who obtained a grade of C in that course has scored 12 credit points.

8.5 Release of Examination Results

a. At the end of each semester, a provisional list of successful candidates in courseexamination shall be published by the Chief Examiner soon after the ratification of the recommendation of the Board of Examiners by the Faculty Board.

b. The proceedings of Boards of Examiners are confidential and are in no circumstances tobe disclosed at any time to any candidate or to any other unauthorized person.

c. However, without prejudice to Regulation (b) above, a student contesting a given grade after the release of results can appeal to the Vice-Chancellor, who shall cause the Head of Department to call for the affected paper of the candidate for re-marking. This shall be done after payment of the prescribed fee.

d. The final results of candidates for the award of a degree shall be published by the Registrar after they have been approved by Senate.

8.6 Calculation of Grade Point Average [GPA]

The overall performance of each candidate during an entire semester shall be determined by means of a weighted grade point average, obtained by awarding credit points in respect of each course multiplied by the numeral value of the grade obtained as follows:

Level of Performance	Rating	Credit Points per Unit
A	70% - 100%	5
B	60% - 69%	4
C	50% - 59%	3
D	45% - 49%	2
E	40% - 44%	1
F	0% - 39%	0

8.6.1 Definition of Terms

a. Student Workload: This is defined in terms of course units. One unit represents one hour of lecture or one hour of tutorial or 2 - 4 hours of practical work per week throughout a semester. Thus, a course in which there are 2 hours of lectures and 1 hour of tutorial per week is a 3 unit course.

b. Total Number of Units (TNU): This is the total number of course units carried by a student in a particular semester. It is the summation of the load units on all courses carried during the semester. For example, a student who is carrying 6 courses of 3 units each has a TNU of 18 for that semester. No student shall be allowed to carry (i.e., register for) or be examined in more than 24 units in any particular semester.

c. Cumulative Number of Units (CNU): This is the summation of total number of units over all the semesters from the beginning to date. A student who is prone to repeating courses will finish (if he does not drop out) with a higher CNU than his non-repeating colleagues. He will most likely require a longer time to complete requirements for the award of degrees.

d. **Level of Performance Rating:** This is the rating of grades obtained in terms of credit points per load unit. Based on the above, a student who obtained a grade of "A" in a 4-unit course has scored 20 credit points, and one who obtained a grade of C in that course has scored 12 credit points.

e. **Total Credit Point (TCP):** This is the sum of the products of the course units and rating in each course for the entire semester period. For example, consider a student who took 4 courses of 4 units each. Let's say the grade obtained in the four courses were C.B.E.D. respectively. The TCP of this student is obtained as 4 x 3 + 4 x 4 + 4 x 1 + 4 x 2 = 40

f. **Cumulative Credit Point (CCP):** This is the summation of Total Credit Points over all semesters from beginning to date.

g. **Grade Point Average (GPA):** This is the total credit points (TCP) divided by the total units (TNU). For example, consider the student's scores referred to above. His TCP is 40, and of course, his TNU is 20 (4 courses at 5 units each, for the semester). The highest GPA that can be earned is 5.0 and that is when a student has earned a grade of "A" in every course during the semester. The lowest GPA obtainable is 0.0 and this would happen if the student has F all round during the semester.

h. **Cumulative Grade Point Average (CGPA):** This is the summation of TCPs for all semesters, divided by the summation of TNUs for the said semesters. Like the GPA, CGPA obtained ranges from 0 to 5.

8.6.2 GPA and CGPA Sample Computations

Consider a student who has enrolled for his/ her 100-level courses and has just completed 2 full semesters in the University, His GPA and CGPA could be computed as follows (Tables 1a & 1b):

Table 1a: Example of CGPA Computation for First Semester

Course Code	**Course Title**	**Units**	**Examination Score**	**Rating**	**CP**	**TCP**	**TNU**
ELP 101	Entrepreneurial Leadership I	2	75 (A)	5	10	10	2
MTH 101	General Mathematics I	3	35 (F)	0	0	10	5
PHY 101	General Physics I	3	60 (B)	4	12	22	8
PHY 103	Practical Physics I	1	87 (A)	5	5	27	9
CHM 101	General Chemistry I	3	67 (B)	4	12	39	12
CHM 103	Practical Chemistry I	1	78 (A)	5	5	44	13
GST 101	Communication in English I	3	45 (D)	2	6	50	16
GNE 101	Introduction to Computer Technology	3	88 (A)	5	15	65	19
GST 109	Use of Library, Study Skills & ICT Literacy	1	70 (A)	5	5	70	20
GST 111	Citizenship and Human Kinetics Education	2	50 (C)	3	6	76	22

$$\text{GPA} = \frac{TCP}{TNU} = 3.45$$

Table 1b: Example of CGPA Computation for Second Semester

100-LEVEL: 2ND SEMESTER							
Course Code	Course Title	Units	Examination Score	Rating	CP	TCP	TNU
GNE 102	Engineer-in-Society	1	75 (A)	5	5	5	1
GNE 104	Introduction to Computational Software	1	75 (A)	5	5	10	2
GNE 106	Introduction to Engineering Drawing	1	60 (B)	4	4	14	3
MTH 102	General Mathematics II	3	87(A)	5	15	29	6
MTH 104	Vectoral Analysis	3	88(A)	5	15	44	9
CHM 102	General Chemistry II	3	67(B)	4	12	56	12
CHM 104	Practical Chemistry II	1	54(C)	3	3	59	13
PHY 102	General Physics II	3	78(A)	5	15	74	16
PHY 104	Practical Physics II	1	45(D)	2	2	76	17
PHY 106	Properties of Matter	1	56(C)	3	3	79	18
GST 102	Communication in English II	2	72(A)	5	10	89	20
GST 104	Philosophy, Logic and Issues in Science of Human Existence	1	76(A)	5	5	94	21
ELP 102	Entrepreneurial Leadership II	2	63(B)	4	8	102	23

Previous: TCP = 76, TNU = 22, GPA = 3.45; Current: TCP = 102, TNU = 23, GPA = 4.43

$$\text{CGPA} = \frac{76+102}{22+23} = 3.95$$

8.6.3 Withdrawal from the University

Students are considered withdrawn from the University when their case falls under any of the following.

a. **Termination of Studentship:** A student that fails to register for courses in two consecutive semesters are credited with 2 Number of Registration Information (NRI) and subsequently withdrawn from the University.

b. **Poor Academic Performance: A s**tudent is considered to have automatically withdrawn from the university if he/she scores a Cumulative Grade Point Average [CGPA] that is less than one in two consecutive semesters.

c. **Voluntary Withdrawal:** A student is also considered withdrawn when his/her application for voluntary withdrawal has been processed through all the statutorilymeetings for such a case.

d. **Gross Misconduct:** A student can also be considered for withdrawal through expulsion from the University when found guilty of a gross misconduct by the University Administration. Offences leading to such misconduct includes: examination malpractice disobedience to the University Authority through one of several misdemeanors.

8.7 Final Assessment and Classification

Final assessment of the student can be summarized as follows:

a. A student's workload is defined in terms of course units. One unit represents one hour of lecture or one hour of tutorial or 24 hours of practical work per week throughout a semester. All courses shall run for one semester or a full session of two semesters.

b. The final award and the class of the degree shall be based on the Cumulative Grade Point Average [CGPA] obtained by each candidate in all prescribed courses approved by the University. The final cumulative grade point average shall be calculated-on the basis of the total number of credit points and the total number of course units registered for during the course of the student's programme. In the case of a failed course, the candidate must repeat the course at the next available opportunity. If the course is an elective, the candidate may substitute another course which is an elective, and shall not be required to pass the failed elective course. If the course is a restricted elective, substitution can only be made from the list of restricted electives. The failed grade would, however, be reflected in the transcript.

c. A candidate who scores a cumulative grade point average [CGPA] of less than 1.00 in two consecutive semesters shall be required to withdraw from the University.

d. A candidate who has satisfactorily completed all requirements for the degree with an overall grade point average of not less than 1.50 shall be awarded the honours degree as follows:

I.	**First Class**	**4.50 - 5.00**
II.	**Second Class (Upper Division)**	**3.50 - 4.49**
III.	**Second Class (Lower Division)**	**2.40 - 3.49**
IV.	**Third Class**	**1.50 - 2.39**
V.	**Pass**	**1.00 - 1.49**

Passes in required units of special electives is a requirement for graduation.

8.8 Student Registration on E-Portal

Visit the university URL with https://www.elizadeuniversity.edu.ng/ then click on Student portal url or visit the student portal directly via https://student.elizadeuniversity.edu.ng/ . Follow the instruction. Pay the school fee and register all the necessary courses from course list for the programme through student.elizadeuniversity.edu.ng portal.

9.0 LIST OF COURSES

Programme Workload for 100 – level 1st Semester

Course Code	Course Title	U*	ST	Contact hours per week		
				L	T	P
CHM 101	General Chemistry I	3	C	2	1	0
CHM 103	Practical Chemistry I	1	C	0	0	3
MTH 101	General Mathematics I (Algebra and Trigonometry)	3	C	2	1	0
PHY 101	General Physics I	3	C	2	1	0
PHY 103	Practical Physics I	1	C	0	0	3
GST 101	Communication in English I	2	C	1	1	0
GST 109	Use of Library, Study Skills & ICT	1	C	1	0	0
GST 111	Citizenship and Leadership Education	1	E	1	0	0
GNE 101	Introduction to Computer Technology	3	C	2	0	3
Total		**18**				

**U - Unit, ST – Status, L – Lecture Hour(s), T – Tutorial Hour(s), P – Practical Hour(s)*
Core (C), Elective (E)

Programme Workload for 100 – level 2nd Semester

Course Code	Course Title	U	ST	Contact hours per week		
				L	T	P
CHM 102	General Chemistry II	3	C	2	1	0
CHM 104	Practical Chemistry II	1	C	0	0	3
MTH 102	General Mathematics II (Calculus)	3	C	2	1	0
MTH 104	General Mathematics IV (Vector Mechanics)	3	C	2	1	0
PHY 102	General Physics II	3	C	2	1	0
PHY 104	Practical Physics II	1	C	0	0	3
PHY 106	Properties of Matter	1	C	1	0	0
GNE 102	Engineer –in– Society	1	C	1	0	0
GNE 104	Intro. to Computational Software	1	C	1	0	0
GNE 106	Introduction to Engineering Drawing	1	C	0	0	3
GST 102	Communication in English II	2	C	1	1	0
Total		**20**				

Programme Workload for 200 – level 1st Semester

Course Code	Course Title	U	ST	Contact hours per week			PREQ.
				L	T	P	
CSC 201	Computer Programming I	3	C	2	0	3	
GNE 251	Engineering Drawing I	3	C	1	0	6	
GNE 253	Engineering Mathematics I	3	C	2	1	0	MTH 101

GNE 255	Applied Mechanics	3	C	2	1	0	
GNE 257	Fundamentals of Electrical Engineering I	2	C	2	0	0	
GNE 259	Materials Science	3	C	2	0	3	
GNE 297	Fundamentals of Electrical Engineering Laboratory I	1	C	0	0	3	
GST 215	Entrepreneurship I	2	C	2	0	0	
GST 205	Nigerian Peoples and Cultures	1	E	1	0	0	
Total		**21**					

Programme Workload for 200 – level 2nd Semester

Course Code	**Course Title**	**U**	**ST**	**Contact hours per week**			**PREQ.**
				L	**T**	**P**	
GNE 252	Workshop Practice	2	C	1	0	3	
GNE 254	Engineering Mathematics II	3	C	2	1	0	MTH 102
GNE 256	Fundamentals of Fluid Mechanics	2	C	2	0	0	PHY 106
GNE 258	Fundamentals of Electrical Engineering II	2	C	2	0	0	
GNE 260	Strength of Materials I	3	C	2	0	3	
GNE 262	Fundamentals of Thermodynamics	2	C	2	0	0	
GNE 296	Fundamentals of Fluid Mechanics Lab. I	1	C	0	0	3	
GNE 298	Fundamentals of Electrical Engineering Laboratory II	1	C	0	0	3	
GST 210	Introduction to Musicology	1	C	1	0	0	
GST 216	Entrepreneurship II	2	C	0	0	6	
CSC 206	Human Computer Interaction	2	R	2	2	0	
Total		**21**					

Programme Workload for 300 – level 1st Semester

Course Code	**Course Title**	**U**	**ST**	**L**	**T**	**P**	**PREQ.**
GNE 351	Engineering Mathematics III	3	C	2	1	0	GNE 253
EEE 353	Instrumentation and Measurements	3	C	2	0	3	
EEE 351	Electromagnetic Field	3	C	2	1	0	MTH 103
EEE 357	Electric Circuits	3	C	2	1	0	GNE 207
EEE 355	Physical Electronics	3	C	2	0	3	
ICE 301	Operating Systems	3	C	2	1	0	
ICE 303	Database Design and Management	2	C	2	0	0	
Total		**20**					

Programme Workload for 300 – level 2nd Semester

Course Code	Course Title	U	ST	L	T	P	PREQ.
GNE 352	Engineering Mathematics IV	3	C	2	1	0	GNE 254
GNE 354	Engineering Communications	2	R	2	0	0	
EEE 354	Electromagnetic Waves	2	C	2	0	0	EEE 351
EEE 352	Electrical Machines I	3	C	2	0	3	GNE 258
ICE 302	Information System Analysis and Design	2	C	1	0	3	
ICE 304	Computer Organization and Architecture	3	C	2	1	0	
CSC 310	Object-Oriented Programming	3	C	2	0	3	
Total		**18**					

Programme Workload for 400 – level 1st Semester

Course Code	Course Title	U	ST	L	T	P	PREQ
GNE 451	Engineering Statistics	3	C	2	1	-	
EEE 453	Control systems I	2	C	2	-	-	EEE 357
ICE 401	Computer Security Techniques	2	C	2	-	-	
ICE 403	Data Communication System & Network Applications	3	C	2	-	3	
ICE 405	Internet Technology & Programming	3	C	2	-	3	
ICE 407	Data Structures and Algorithms	2	C	2	-	-	
ICE 409	Satellite Communication	3	C	2	1	-	
ICE 411	Communication Principles	3	C	2	1	-	
Total		**21**					

Programme Workload for 400 - level 2nd Semester

Course Code	Course Title	U	ST	L	T	P	PREQ
ICE 200	Student Work Experience Programme (SIWEP)	3	C	-	-	9	
ICE 300	Student Industrial Work Experience (SIWES I)	3	C	-	-	9	ICE 200
ICE 400	Student Industrial Work Experience (SIWES II)	9	C	-	-	27	ICE 300
Total		**15**					

Programme Workload for 500 - level 1st Semester

Course Code	Course Title	U	ST	L	T	P	PREQ.

GNE 551	Engineering Law and Management	3	C	2	1	-	
EEE 551	Digital Signal Processing	3	C	2	1	-	
ICE 501	Mobile Communication & Network	3	C	2	-	3	
ICE 503	Java Technology & Programming	2	C	2	1	-	
ICE 505	Artificial Neural Network	3	C	2	1	-	
ICE 509	Research Methodology	1	C	1	-	-	
	Electives (1 Course)	2	E	2	-	-	
ICE 511	Final Year Project 1	3	C	-	-	9	
Total		**20**					

Electives: Students are required to take a minimum of two units from any of the optional courses:

Course Code	**Course Title**	**U**	**ST**	**L**	**T**	**P**	**PREQ.**
EEE 559	Telecommunication Engineering	2	E	2	-	-	EEE 457
ICE 513	Random Process & Queue Theory	2	E	2	-	-	
ICE 515	Project Management	2	E	2	-	-	

Programme Workload for 500 - level 2nd Semester

Course Code	**Course Title**	**U**	**ST**	**L**	**T**	**P**	**PREQ.**
GNE 552	Engineering Economics and Valuation	3	C	2	1	0	
ICE 502	Software Development Techniques	3	C	2	0	3	
ICE 504	Introduction to Enterprise Resource Planning Systems	3	C	2	1	0	
ICE 506	Design & Installation of ICT services	3	C	2	0	3	
	Electives (1 Course)	2	E	2	0	0	
ICE 512	Final Year Project II	3	C	0	0	9	ICE 511
EEE 552	Reliability and Maintainability of Electrical Systems.	2	C	2	0	0	
Total		**19**					

Electives: Students are required to take a minimum of four units from any of the optional courses

Course Code	**Course Title**	**U**	**ST**	**L**	**T**	**P**	**PREQ.**
ICE 508	Multimedia Technology & Programming	2	E	2	0	0	
ICE 510	Computer Graphics & Animation	2	E	1	0	3	

ICE 514	Cyberpreneurship & Cyber law	2	E	2	0	0	

OLD CURRICULUM TO BE COMPLETED BY 500L 2022/2023 SESSION

Programme Workload for 500 - level 1st Semester

Course Code	**Course Title**	**U**	**ST**	**L**	**T**	**P**
GNE 501	Engineering Economics	3	C	2	1	-
EEE 511	Reliability & Maintainability of Electrical Systems	2	C	2	-	-
EEE 519	Digital Signal Processing	3	C	2	1	-
ECT 513	Java Technology & Programming	2	C	2	1	-
ECT 515	Mobile Communication & Network	3	C	2	-	3
ECT 521	Cyberpreneurship & Media law	2	C	2	-	-
ECT 523	Computer Security Techniques	2	C	2	-	-
	Electives (2 Courses)	4	E	-	-	-
Total		**21**				

Electives: Students are required to take not more than four units from any of these optional courses.

Course Code	**Course Title**	**U**	**ST**	**L**	**T**	**P**
EEE 531	Introduction to Nanotechnology	2	E	2	-	-
EEE 539	Telecommunication Engineering	2	E	2	-	-
ECT 533	Random Process & Queue Theory	2	E	2	-	-
ECT 535	Data Structure & Algorithms	2	E	2	-	-

Programme Workload for 500 - level 2nd Semester

Course Code	**Course Title**	**U**	**ST**	**L**	**T**	**P**
GNE 502	Engineering Management	3	C	2	1	-
ECT 524	Computer Graphics & Animation	2	C	1	-	3
ECT 528	Design & Installation of Electrical & ICT Services	3	C	2	-	3
EEE 532	Object Oriented Design & Programming	3	C	2	-	3
ECT 590	Final Year Project	6	C	-	-	-
ECT 516	Software Development Techniques	3	C	2	-	3
	Electives (1 Course)	2	C	-	-	-
Total		**22**				

Electives: Students are required to take only two units from any of these optional courses

Course Code	Course Title	U	ST	L	T	P
ECE 526	Robotic & Automation	2	E	2	-	-
ECT 532	Multimedia Technology & Programming	2	E	2	-	-
ECT 534	Telecommunication Systems Planning	2	E	2	-	-

Old/New Course code	**Course Title**	**Units**

ECT 413/ICE 505	Artificial Neural Network	3 units
ECT 417/ICE 405	Internet Technology and Programming	3 units
ECT 535/ICE 407	Data Structures & Algorithm	2 units
ECT 524/ICE 510	Computer Graphics & Animation	3 units

MTH 101 General Mathematics I 3 Units

Elementary set theory, subsets, union, intersections, complement, Venn diagrams. Real numbers; integers, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic equations, binominal theorem. Complex numbers; algebra of complex numbers; the Argand Diagram. De Moivre's theorem, nth roots of unity. Circular measure trigonometric functions of angles of any magnitude, addition and factor formulae.

MTH 102 General Mathematics II 3 Units

Calculus: Function of a real variable, graphs, limits and idea of continuity. The derivative, as limit of rate of change. Techniques of differentiation. Extreme curve sketching, Integration as an inverse of differentiation. Methods of integration, Definite integral. Application to areas. Volumes etc.

MTH 104 General Mathematics IV 3 Units

Vectors in Euclidean spaces, vector products, equation of lines and planes, element of vector calculus. General kinematics: momentum, angular momentum, fundamental equations of motion.

CHM 101 General Chemistry I 3 Units

Atoms, atomic structures, atomic theory, atomic spectra, Aufbau method, Hund's rule, Pauli Exclusion principles, Periodicity and periodic table, molecules, chemical equation and stoichiometry Rates of chemical reaction, energetics Thermochemistry and simple calculations involving Hess's law, Bonding and intermolecular forces, Hybridization and shapes of molecules (Valence Forces; structure of Solids; molecular and ionic forces). Metals and extraction of metals, The Chemistry of selected metals and non- metals Chemical equilibrium reactions, Properties of gases, solutions, Redox reactions, Introduction to Electro-chemistry, electrolytic and galvanic cells, Fuel cells, electrode potential, half-cell equation. Faraday laws of electrolysis, Corrosion. Colligative properties, corrosion, Acid, Bases and salts, Introduction to Radioactivity.

CHM 102 General Chemistry II 3 Units

Historical survey of the development and importance of organic chemistry, nomenclature and classes of organic compounds, Homologous series; isolation and purification of organic compounds; qualitative and quantitative- determination of empirical and molecular formulae, percentage purity, yield, organic chemistry; stereochemistry; determination of structure of organic

compounds; Electronic theory in organic chemistry; Saturated hydrocarbons and Unsaturated hydrocarbons; alkenes, alkynes and aromatics. Functional group; carbonyls, halides, carboxylic acids and hydroxyl, Valence Forces; structure of Solids; molecular and ionic forces. The Chemistry of selected metals and non- metals– relative abundance.

CHM 103 Practical Chemistry I **1 Unit**

Calibration of Measuring Instrument; Standardization of HCl with Standard Sodium carbonate; Standardization of alkali with standard potassium hydrogen phthalate. Determination concentrations of commercial (H2SO+, HNO3, NaOH); Preparation of Sulphide of Copper and determination of its Empirical Formula.; Determination of the atomic weight of a metal by forming its Oxides; Determination of atomic weight of a metal from the volume of Hydrogen it displaced from an acid; preparation of double salts; determination of heat of neutralization; determination of Faraday's constant. Introduction of scientific techniques to local science in the environment.

CHM 104 Practical Chemistry II **1 Unit**

Identification of elements in an organic compound Lassaigne: sodium fusion Test; Ignition Tests; Separation of mixtures, determination of Melting points; Re-crystallisation; Simple experiment reactions of Urea (carbamide); Test for aldehydes; Detection of carbonyl] group. Ignition test, Estimation of iron in ferrous ammonium sulphate using standardized potassium permanganate, Qualitative inorganic analysis.

PHY 101 General Physics I **3 Units**

Space and Time, frames of reference, Invariance of physical laws, relativity of simultaneity, relativity of time intervals, relativity of length, units and dimension; standards and units, unit consistency and conversions. Kinematics vectors and vector addition, components of vectors, unit vectors, products of vectors. Displacement, Time and average velocity, instantaneous velocity, average acceleration, motion with constant acceleration, freely falling bodies, position and velocity vectors, acceleration vector, projectile motion. Motion in a circle and relative velocity. Fundamental laws of mechanics: forces and interactions, Newton's first law, Newton's second law, mass and weight, Newton's third law. Statics and dynamics: application of Newton's laws, dynamics of particles, frictional forces, dynamics of circular motion. Galilean invariance, universal gravitation, gravitational potential energy, elastic potential energy, conservative and non-conservative forces. Work and energy, kinetic energy and the work-energy theorem, power, momentum and impulse, conservation of momentum, collisions and momentum conservation, elastic collisions, centre of mass. Rotational dynamics and angular momentum angular velocity and acceleration, energy in rotational motion, parallel axis theorem, torque, torque and rotation

about a moving axis, simple harmonic motion and its applications. The simple pendulum, damped oscillations, forced oscillations and resonance.

PHY 102 General Physics II 3 Units

Electrostatics: Conservation law of electric charges, electrons and electrostatics, Coulomb's law, electric field and forces, electric field line, electric dipoles charged particles in an electric field, charge and electric flux, Gauss's law and its applications, electric potential, electric potential due to a single charge, electric potential due to a dipole, electric potential due to continuous charge distribution equipotential surfaces. Conductors and currents: electric current, resistors and resistance, electric power, capacitors in series and parallel, energy storage in capacitors and electric field energy, Gauss's law in dielectrics. Magnetism: magnetic field, magnetic field lines and magnetic flux, motion of a charged particles in a magnetic field, magnetic force on a current carrying conductor, Ampere's law, Biot-Savart law, electromagnetic induction, inductance, self-inductance, mutual inductance, Maxwell's equation, electromagnetic waves and oscillations.

PHY 106 Properties of Matter 1 Unit

Molecular treatment of properties of matter, elasticity; Hooke's law. Young's shear and bulk moduli. Hydrostatics; Pressure; buoyancy. Archimedes principles. Hydrodynamics; Streamlines Bernoulli and continuity equations. Turbulence, Reynolds number. Viscosity; Laminar flow, Poiseuilles's equation. Surface tension; adhesion, cohesion, capillarity, drops and bubbles. Temperature; zeroth law of thermodynamics; heat; gas laws of thermodynamics; kinetic theory of gases and application.

PHY 103 Practical Physics I 1 Unit

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: Mechanics: timing experiments, simple pendulum, compound pendulum, measurement of g, moments, determination of moment of inertia, measurement of viscosity, use of force board, law of momentum. Optics: reflection using plane mirror, convex/concave mirror, concave/convex lens, refraction using a prism, critical angle, apparent depth/real depth, simple microscope, compound microscope.

PHY 104 Practical Physics II 1 Unit

Electricity: Ohm's law, heating effect of a current internal resistance of a cell, Metre/Wheatstone bridge, potentiometer measurement of ece, plotting of magnetic field. Heat: measurement of specific capacity of water, and a solid, expansion of gas experiment using a long capillary tube, Joule's law. Sound: resonance tube, Sonometer.

GST 101 Communication in English I (study skills) 2 Units

Introduction: the nature and functions of language, varieties and styles of English usage. Time Management. Study Skills; contemporary definition of literacy, introduction to the language skills. Vocabulary development: word formation, meaning relationships, register. Listening and Lecture Comprehension. Note -taking/note-making. Introduction to reading for Academic Purposes. Revision and test-taking skills

GST 102 Communication in English II 2 Units

Awareness raising: sources and types of writing errors. Grammatical structures: element of the sentence. Word, Phrase and Clause. Sentence types: classification by structure and function. The paragraph: definition and characteristics, patterns of development. Varieties of writing: discourse types, writing formats. The Mechanics of writing. The academic writing process.

GST 109 Use of the Library and Information Literacy 2 units

Definition and types of library. Example of a library set up (introduction to the EUIM library). Organisation of a library. Forms of recorded information: print, non-print and electronic forms. Reference sources and services. Serials and periodicals. Use of ICT in the library. Internet applications: e-resources, social media networks, databases. Virtual libraries. Organization and retrieval of knowledge. The library catalogue. Classification schemes. Introduction to report writing. Search strategies, referencing. Referencing styles.

GNE 101 Introduction to Computer Technology 3 Units

History of Computers; functional components of a computer; characteristics of a computer system. Definition of computer science. History of computer science and their generations, Computer Hardware; Modern I/O units. Software: Operating Systems, Application Packages Program: Development; Flowcharts and Algorithms; Program Object; VISUAL BASIC programming language serves as the vehicle to illustrate the many concepts.

GNE 102 Engineer-in-Society 1 Unit

Philosophy of Science and Engineering. History of Engineering and Technology. The Engineering profession - engineering - 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 to Risk analysis. Case studies from invited professionals.

GNE 104 Introduction to Computational Software 1 Unit

This course covers the introduction and applications of commonly used computational software

packages. Overview of Computational Software. Evolution and trends in Computational Software development. Using MATLAB as an example of computational Software. Introduction to MATLAB. Basic features of MATLAB. Creating MATLAB variables; managing MATLAB workspace; MATLAB mathematical functions. Basic plotting; Matrix generation; Array operations and Linear equations. Introduction to programming in MATLAB. Control flow and operators. Debugging M-files. Introduction to other computational software packages: overview of GNU Octave and Scilab.

GNE 106 Introduction to Engineering Drawing 1 Unit

Introduction to drawing instruments, scales, draughting aids and their proper use. Size of paper and drawing layout. Dimensioning, line work, layout and lettering. Geometrical constructions and Engineering graphics. Graphical calculus and Applications. Circles and Tangents. 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. Introduction to projections.

GST 111 Citizenship and Leadership Education 1 unit

Citizenship, qualities of a good citizen. Human rights, limitations to citizen's rights, protection of citizens' rights, duties and obligations: duties of citizens, obligations of citizens to the state. Moral principles and moral obligations, Drugs and medicines, drug abuse and its effects, drugs and health care, prescription and compliance, natural medicines and ethno therapy. Family life education: reproductive health, harmful health, practice safe motherhood, relationships and sexual behavior. Concepts of health and disease: concepts of well-being and disease, disease causation, HIV/AIDS, transition, prevention and control, stigmatization of responsibility, types of leadership, leadership and political power; Goal setting, vision and mission, Delegation of duties.

GST 205 Nigerian People and Cultures 1 unit

Introduction to Nigerian history, Introduction to Nigerian culture. Sources of Nigerian history. Culture and socialization. Primitive science and technology. Traditional religion and belief systems, Penetration of Christianity and Islam. Traditional political structures and administration. Modern day politics and culture. Culture and economic development. Traditional financial institutions. Festival and ritual in Nigerian culture. Festival as drama. Understanding the People/Cultures of Nigeria through their Art. The role of museums. Nigeria literature. The quest for appropriate technology. Cultural revival.

GST 210 Introduction to Musicology 1 Unit

Elements of music; rhythm combination and extension. Choral singing, ensemble work and special instrument (including voice).

GST 215 Entrepreneurship I 2 Units

Introduction to entrepreneurship and new venture creation. Theory of entrepreneurship. Types of business organization. Initiating enterprises. Sources of finance/raising capital cost. Budgeting techniques and financial planning. Managerial functions with special emphasis on staffing. Marketing and the new venture. Accounting and special tax problems. Insurance issues in business. Environmental impact considerations. Student's business proposal.

GST 216 Entrepreneurship II 2 Units

Photography, 2D & 3D animation & motion graphics, Beed making, event planning and management, Fashion designing, Tighing and Dyeing/Adire Fabrics, Shoe & Bag making, Make-up and gele.

CSC 201 Computer Programming I 3Units

Prerequisite: CSC 101

An introduction to computer programing with emphasis on mathematical problems using python programing language or any other scientific programming language. Introduce students to computers, compilers and editors, and they are expected to write medium-sized programs. Implementation of concepts such as binding, scope, looping, branching, subprograms and parameter parsing, tasks and concurrency, heap management, exception handling, templates, inheritance and overloading.

GNE 251 Engineering Drawing I 3 Units

Development of geometrical figures and intersection of solids and curves. Projections – lines, planes and simple solids. Orthographic projections in first and third angles. Isometric Projection; sections and sectioning, auxiliary views and staggered sectioning. Pictorial/Freehand Sketching. Conventional practices with Simple examples, including threads and threaded fasteners, cam profiles and Assembly drawing from detailed components. Introduction to Computer Aided Drafting: Electronic draughting packages: principle and use in engineering design. Simulation packages: principle and use in engineering.

GNE 252 Workshop Practice 2 Units

Safety procedure in workshop and Workshop setting; Types of workshop equipment, machines and materials; Use of instruments and tools (hand and machine tools), Measurement and marking out; Bench work and fitting; Machine operation practice. Carpentry: Hand tools and working principles; Joints and fastenings: bolt, rivet, welding, brazing, soldering. Invited lectures from Professionals.

GNE 253 Engineering Mathematics I 3 Units

Complex analysis – Elements of complex algebra, trigonometric, exponential and logarithmic functions. Real number, sequences and series. Composite functions, matrices and determinants. Vectors – Elements, differentiation and integration, Elements of linear algebra, Calculus – Elementary differentiation. Relevant theorems.

GNE 254 Engineering Mathematics II 3 Units

Differential equations – Exact Equations. Methods for second order equations. Partial differential equation. Simple cases – Applications, Numerical Analysis – linear equations, non-linear equations. Transformation and mapping: special functions. Finite difference operators: Introduction to linear programming.

GNE 255 Applied Mechanics 3 Units

Forces, force resolution, moments, couples, Varignon's theorem. 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.

GNE 256 Fundamental of Fluid Mechanics 2 Units

Nature and types of fluids; Physical properties of fluids; Fluid statics, stability of submerged and floating bodies; Fluid flow concept; conservation of mass, momentum energy; Simple applications of conservation laws; Flow measurement.

GNE 257 Fundamental of Electrical Engineering I 2 Units

Fundamental theory of electric circuit. Direct current (DC) circuit elements. Basic circuit laws and theorems—Ohms Law, Kirchoff's Laws; Superposition, Thevenin and Norton's theorems. Nodal and loop analysis of circuits, single time-constant circuits. Steady state response of circuit elements and network. Complex impedance and admittance. Alternating current (AC) circuits impedance, admittance, susceptance, and phasor diagrams. Introduction to electronics, an overview of tubes (vacuum diode, triode and pentode). Elementary discussion of semiconductors PN junction diode and bipolar Junction Transistor. Small signal equivalent circuits.

GNE 258 Fundamental of Electrical Engineering II 2 Units

Periodic waveforms and their average and effective values. Characteristics and use of non-linear elements in simple circuits. Magnetic circuits, single-phase alternating current (AC) circuits. Series and parallel resonance. Power factor correction, magnetic circuit, mutual inductance. Introduction to electric machines, machine designs, and polyphase systems; DC generators and motors.

Electrical and electronic power measuring instruments and equipment, AC and DC bridges. Basic control system, span/closed loop system. Introduction to basic communication fundaments.

GNE 259 Materials Science 3 Units

Review of properties of matter, relationships between structure and properties of metals, alloys, ceramics and plastics. Atomic and molecular structure, crystals, Metallic states, Defects in crystals, conductors, semi-conductors and insulators. Alloy theory – Application to industrial alloys – steel in particular. Engineering Properties – Their control, Hot and cold working, heat treatment, etc. Creep, fatigue and fracture. Corrosion and corrosion control. Non-metallic materials – glass, rubber, concrete, plastics, wood and ceramics. Elastic and plastic deformations: Defects in metals.

GNE 260 Strength of Materials I 3 Units

Hooke's law; Method of superposition; Stress and deformation resulting from temperature changes; Elastic Constants; Stress in thin cylinders and spheres; Stresses on inclined planes. Principal stresses, Mohr's circle. Structural mechanics of statistically determinate rigid body systems and plane pin-jointed frames; Bending moment and shear force in beams, Simple beam and deflection of beam, truss and elastic buckling of columns; Simple torsion and application; Stress and strain transformation equations.

GNE 262 Fundamentals of Thermodynamics 2 Units

Basic concepts, quantitative relations of Zeroth, first (applications to open and closed systems; the steady State flow/ Bernoulli's equation and applications), second and third laws of thermodynamics. Behaviour of pure substances and perfect gases; Ideal gas cycles.

GNE 296 Fundamentals of Fluid Mechanics Laboratory I 1 Unit

Determination of fluid properties. Pressure measurement. Hydrostatic force on plane surface. Determination of metacentric height. Determination of stability of floating bodies. Verification of Bernoulli's theorem.

GNE 297 Fundamentals of Electrical Eng. Laboratory I 1 Unit

Identification of resistors and resistor colour coding, Series connections, Parallel connections, Verification of Ohm's law, Verification of Kirchhoff's Voltage Law, Verification of Kirchhoff's Current Law, Loop analysis, Verification of Thevennin's Theorem, Experiment to verify Norton's theorem, Superposition Theorem.

GNE 298 Fundamentals of Electrical Eng. Laboratory II 1Unit

Alternating current waveforms: Sine wave, square wave and triangular wave forms, RLC Series Circuits, RLC Parallel Circuits, Half wave rectification Circuit, Full wave rectification Circuit,

Design and Construction of Monostable Multivibrator, Design and Construction of a stable Multivibrator, Design and Construction of Bistable Multivibrator, Series and parallel Resonant Circuits, Design and Construction of filters.

CSC 206 Human-Computer Interaction (HCI) 2 Units

Foundations of HCI, Principles of GUI toolkits; Human-centred software evaluation and development; GUI design and programming and application programmatic interface; event driven application design and development; interaction devices; system and feedback messages, gesture recognition system, virtual relative, multimedia system, robotic etc.

GNE 351 Engineering Mathematics III 3 Units

Fourier series – Euler coefficients, even and odd functions, Sine and Cosine, functions, simple applications, Gamma, Beta and probability functions. Differential equation of second order– series solutions. Legendre and Bessel functions and their properties. Vector Theory – Dot product, cross product, divergence, curl and Del operators. Gradient. Line, Surface and volume integrals and related theorems.

GNE 352 Engineering Mathematics IV 3 units

Complex variables – advanced topics, differentiation and integration of complex functions. Cauchy – Riemann equations: Related theorems. Laplace and Fourier transforms – Applications. Introduction to non-linear differential equations – stability and Applications.

GNE 354 Engineering Communication 2 Units

Oral communication: Public speaking skills with effective use of visual aids and statistical and technical information. Principles of effective communication in interpersonal and mass communication process. Effective reading skills- extracting main ideas and reading for specific information through speed reading. Written communication: principles of technical writing. Planning and experimental design; data collection and analysis; scientific writing and presentation. Grant writing and funding sources. Ethics and intellectual property. 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; seminar presentation of reports and proposals. Project report presentation.

EEE 351 Electromagnetic Fields 3 Units

Review of electric fields and magnetic fields. Static field vs time-varying fields. Separation vectors. Electromagnetic laws in differential and integral forms – separation vectors, Coulomb's law, electrostatic fields due to point charges, multiple-point charges and various charge

distributions. Gauss law, boundary condition, electric potential, Laplace, and Poisson equations. Magnetostatic fields, magnetostatic induction, Biot-Savart's law, magnetic flux, field strength, vector potential, magnetic field in and around current carrying conductors, conduction and displacement current. Ampere's law. Faraday's law. Lorentz law. Application examples - application of electromagnetic effects to DC & AC machines, communication and micromechanical systems. Introduction to Maxwell's equations. Design project.

EEE 352 Electrical Machines I 3 Units

Electromechanical energy conversion concepts, rotating magnetic fields, magnetic circuits, magnetic coupling, mutual inductance. The focus of this course is on single phase machines. Principle of machine winding, concentrated and distributed windings, lap and wave windings. DC machines: generators, motors, shunt and series and compound wound DC machines – design, construction, flash-over, sparking, performance characteristics. Transformers: Phasor diagrams, equivalent circuits, regulation, efficiency, characteristics, design, construction, open-circuit, short-circuit test, and polarity tests. Auto-transformers, instrument transformers, single-phase, three-phase transformers, and connections. Parallel operation of transformers. Faults on machines, methods of starting and protection of machines. Induction Machines: Magnetic flux, distribution of induced EMF, equivalent circuit, power balance, and equivalent circuit referred to stator. Torque-slip characteristics for generating and motoring actions; circle diagrams. Methods of starting and speed control. Double cage induction motor. Single phase motors. Introduction to Synchronous Machines. Motor starter circuits and motor control circuits for single-phase machines. Basic principles of selection of motors, generators and transformers for practical applications.

EEE 353 Instrumentation and Measurement 3 Units

General Instrumentation, Basic Meter connections in DC measurement. Basic meter connections in AC measurements; ammeter, 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 voltmeters; oscilloscope, probes, sampling effects, impedance effects. Instruments for generating and analyzing waveforms; square-wave and pulse generator, signal generators, function generators, wave analyzers, 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. Indicating instrument; moving

coil, moving iron, thermal, electrostatic, induction type instrument, I, V, kWh, PF instruments, dynamometer, frequency measurement, digital bridges, and analog electronic measuring instruments, transducers, gauges, recorders. Data conversion and interfacing. Digital electronic measuring system. Data logging and displays. Data Acquisition Systems, software Data Conversion. Multiplexing, Encoders. Transducers: analog electronic instruments for voltage, power wave-form, frequency and phase measurements. Digital instrumentation. Theory of errors: absolute and relative errors. Laboratory Practicals.

EEE 354 Electromagnetic Waves 2 Units

Time-varying magnetic and electric fields; Maxwell's equation (in rectangular co-ordinates and vector- calculus notation): Derivation of Maxwell's equations; Applications of Maxwell's equations. Dielectric, conductors and ionized media. Propagation of electromagnetic waves in free space and in material media. Solution of wave equations. Speed and energy of electromagnetic waves; Poynting vector; boundary conditions, uniqueness theorem, image method. Wave propagation in dielectric media; wave propagation in good conductors, skin effect. Simple class demonstrations. Introduction to transmission lines, wave- guides and optic fibers. Transmission line theory including wave-guides, striplines, and resonators. Smith's Chart. Radiating elements. Introduction to RF design, antenna design and theory. Application examples that employ electromagnetic phenomena for signals and power transmission in RF, microwaves, optical and wireless communication systems. Design project.

EEE 355 Physical Electronics 3 Units

Nature of atom. Basic concepts of semi-conductors charge carriers, effective mass, mobility, conductivity life time. Free electron motion in static electric and magnetic fields, electronic structure of matter, conductivity in crystalline solids. Theory of energy bands in conductors, insulators and semi-conductors; energy band diagram; atomic bonding in semiconductors; electrons in metals and electron emissions; carriers and transport phenomena in semi-conductors; characteristics of some electronic devices – junction diodes, transistors, vacuum tubes, photoresistors, photocell and light emitting diode. Continuity equation, flow equations, Hall Effect; bipolar transistors - characteristics, CB, CC, CE configurations; switching devices. Fabrication techniques of elementary discrete devices and integrated circuit (IC) technology – BJT, MOSFETs, IGBT etc.

EEE 357 Electric Circuits 3 Units

One-Port and Two-Port networks – introduction to devices and components, lumped circuit abstraction. Linear Circuits – energy storage elements, transient response of first and second-order

systems, frequency domain analysis, operational amplifiers and applications. AC circuit analysis techniques, power factor, sinusoidal steady-state response, phasor analysis of AC circuits. Laplace transforms and applications to circuit analysis. Electromechanical circuits – resonance, energy transfer, Q-factor, oscillators and resonators. Active and Passive Filters – design, frequency response of low-pass, band- pass, and high-pass filters. Sallen-Key filter design. Nonlinear circuit applications – analysis of circuits with non-linear resistors, diodes, MOSFETs. Laboratory-based Project.

ICE 301 Operating Systems 3 Units

Early System, Simple Batch Systems, Multi-programmed and Batched Systems, Time-Sharing Systems, Personal-Computer Systems, Parallel Systems, Distributed Systems, Real-Time Systems. Computer- System Structures: Computer-System Operation, I/O Structure, Storage Structure, Storage Hierarchy, Hardware Protection, General-System Architecture. Operating System Structures: System Components, Operating-System Services, System Calls, System programs, System Structure, Virtual Machines, System Design and Implementation, system Generation. Processes, Threads, Interprocess Communication. CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real- time Scheduling, algorithm Evaluation. Deadlocks: System Model, Deadlock Characterization, methods for handling Deadlocks, Prevention, Avoidance, Detection, Recovery, Combined Approach. Memory Management: Address space, Swapping, Contiguous Allocation, Paging, Segmentation, Paged Segmentation. Virtual memory: Demand paging, page replacement, frame allocation, thrashing. File systems: File concept, Access Method, Directory Structure, Protection, File-System Structure, Allocation methods, Free-Space Management, Directory Implementation, Efficiency and Performance, Recovery. MS Windows and UNIX/LINUX architecture, applications, and programming.

ICE 302 Information System Analysis & Design 2 Units

System Development Life Circle: Strategy and planning system analysis, logical design, physical design, implementation maintenance. System Development Techniques and methodologies: by Process modeling, function decomposition diagramming, Entity-Relationship diagramming, data flow diagramming, and procedure modeling. Design and Layout of forms, screens, dialoques, and report. Integrated CASE tool e.g. Oracle Designer to be used for the system development life circle. RAD tools e.g power Builder, Power Objects, visual Basic, IntraBuilder, or C++ Builder for concepts and techniques visualization.

ICE 303 Database Design and Management 2 Units

Overview of Database systems: model, schema, and instance. Database system vs. File systems. Data abstraction levels, database languages, system architecture. Classification of DBMS. Data modeling: Entity-Relationship (ER) Model, Entities and Entity types, Relationship and Relationship type, Constraints, Weak Entity Types, ER, Diagrams. Semantic object model. Process of database design: requirement analysis, conceptual database design, database schema design. Database design using entity-relationship and semantic object models, database application design. Terminology in Relational Data model, Integrity Constraints, Primitive Operations on Relations, Relational Algebra (RA), Relational Algebra Operations, Relational Completeness, Additional Operations on Relations. Foundations of relational implementation. Structured Query Language (SQL): DML Features in SQL, DDL in SQL, updates in SQL, Views in SQL, Embedded SQL, Query-by-Example (QBE). Concurrency, recovery and security issues. Armstrong's inference rules and minimum covers, normal forms. Current trends in database systems: Client-Server database systems, Open Database connectivity (ODBC) standard, knowledge-Based Systems, Object-Based Systems, data warehousing and data mining concepts, Web databases.

ICE 304 Computer Organization and Architecture 2 Units

Introduction to basic concepts of computer organization and design: metrics for computer performance, computer arithmetic, Von Neuman architecture, instruction implementation, control unit, pipelining, memory systems hierarchy, cache memories and basic I/O controllers.

ICE 306 Object-Oriented Programming 3 Units

Basic Object-Oriented Programming (OOP) concepts: Classes, Objects, inheritance, polymorphism, Data Abstraction, tools for developing and design principles. Data types and operators associated with an OOP. Java syntax and data objects. Compiling, interpreting and debugging Java programs, Central flow constructs, objects and classes programming, Arrays, methods. Exceptions, Applets and Abstract, OLE, Persistence, development of Graphical User Interface (GUI) programs, using Abstract Window Toolkit (AWT). Thread concept: Thread methods, thread states, thread priorities and thread scheduling, thread synchronization, daemon threads, runnable interface, thread groups. Multimedia Applications: Loading, Displaying and Scaling Images, Introduction to Animation, Graphics Double Buffering, Media Tracker, Loading and Playing audio Clips, Customizing Applets, Image Maps. Network programming: Introduction, Manipulating URLs, Establishing a Simple Server, Establishing a Simple Client, Client/Server Interactions, Security and the Network. Basic engineering circuits' design using OOP.

ECT 402 Industrial Training Assessed by University Supervisors 4 units

This will be graded by staff and the grade would be used to compute the student's result.

ECT 404 Industrial Training Assessed by Industry-Based Supervisors 4 Units

This will be graded by the industry-based supervisors and the grade returned to the University for processing/ computing the student's result.

ECT 406 SIWES Seminar Presentation and Report 4 units

Each student's report as well as the oral presentation of his or her report on work experience in the industry will be graded by the academic staff in the department. The marks obtained by the student will be used to compute his or her result.

ECT 411/ICE 409 Satellite Communication 3Units

Satellite frequency bands, services, transmission and multiplexing schemes, trans-multiplexing, multiple access schemes. Satellite orbit, satellite motion, paths, geostationary satellites, non-geostationary constellations, satellite subsystems, and satellite launching. Antennas: types, gain, pointing loss, G/T, EIRP; high power amplifiers; low noise amplifiers; BUC/LNB: conversion process, polarization hopping, redundancy configurations; earth station monitoring and control. Basic link analysis, attenuation, sources of interference, carrier to noise and interference ratio, system availability, frequency reuse, link budget, link design. Multiple access techniques: companded FDM-FM-FDMA, SSB-AM-FDMA, amplitude and phase nonlinearities, optimized carrier to noise and intermodulation ratio; TDMA: frame structure, burst structure, frame efficiency, super-frame structure, frame acquisition and synchronization, satellite position determination, TDMA equipment, advanced TDMA satellite systems; CDMA: direct sequence CDMA (DS-CDMA), sequence synchronous and sequence asynchronous DS-CDMA, random access DS-CDMA, link analysis, FH-SS systems, FH-CDMA, acquisition and synchronization. Demand assignment multiple access (DAMA): types of demand assignments, DAMA characteristics, real time frame reconfiguration, DAMA interfaces, SCPC DAMA, SPADE,digital speech interpolation. Message transmission by FDMA: M/G/1 queue, messagetransmission by TDMA: pure ALOHA- satellite packet switching, slotted ALOHA, packet reservation, tree algorithm. Advantages and disadvantages of multibeam satellites,interconnection by transponder hopping, interconnection by on-board switching (SS/TDMA), interconnection by beam scanning, ISL: GEO-LEO, GEO-GEO, LEO-LEO, RF and optical links. VSAT networks: VSAT technologies, network configurations, multi-access and networking, network error control, polling VSAT networks.

ECT 413/ICE 505 Artificial Neural Network 3 Units

Neural Network: Definition of artificial neutral network (ANN). 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, gradient descent rule. Back-propagation neural network, Variable term used in back propagation neural network: learning rate, momentum, hidden nodes, sigmoid activation function. Back propagation algorithm of ANN. Design of ANN model, training sets for ANN, test sets for ANN, network testing and performance. Engineering applications. ANN programming.

ECT 415/ICE 403 Data Communication and Network Applications 3Units

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 (IEEE) 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, connectivity, reliability, backup and recoverymechanisms. 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.

ECT 417/ICE 405 Internet Technology and Programming 3 Units

Introduction to the internet, review of network technologies, transmission control protocol, addressing and routing: IP subnetting and addressing, internet routing protocols. Common internet applications: Client server concepts, DNS, Telnet, FTP, electronic email, World wide web,

creating web pages, designing interactive web pages: HTML forms, Image maps, CSS, Java scripts other technologies, Internet security: intranet, extranet and firewall. Miscellaneous applications: Electronics commerce, real-time applications, IP telephony, Web crawler, search engines, Miscellaneous, Web-based mail, Proxy server, Connectivity.

GNE 451 Engineering Statistics 3 Units

Elements of statistics; Descriptive statistics, frequency distribution, populations and sample, central tendency, variance data sampling, mean, median, mode, mean deviation, percentiles etc. Probability. Binomial, poison hyper- geometric, normal distributions, etc. Statistical inference intervals, tests hypothesis and significance. Estimating Engineering Quantities: Estimators Methods, Confidence Limits and Tolerance. Hypothesis testing; Statistical Inference and Engineering decision situations, operating characteristics curves, parametric and non-parametric tests of engineering data. Introduction to analysis of variance, regression. ANOVA, R-estimates, confidence intervals, correlation analysis. Statistical computer routines.

GNE 501 Engineering Management 3 Units

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.

GNE 502 Engineering Economics 3 Units

Economics of business settings, costing of production systems. Objectives of cost analysis and control. Sources of finance, money and credit for projects. Investment Appraisals. Resource Allocation. Interest rates. Interest formulas and problems. Annual costs. Present worth, rates of return. Cost reducing. Depreciation accounting. Valuation of assets. Financial management; accounting methods, financial statement, elements of costing. Budget and budgeting control. Dwelling with multiple alternatives, uncertainties, planning, and Decision making procedures. Macroeconomics, Economic growth, National Income. Economic of technological change. Economic analysis of engineering projects; value systems economic decisions on capital investments and choice of engineering alternatives; new projects, replacement and abandonment

policies, risky decisions; corporate financial practices. Analysis of tender and project feasibility valuation.

EEE 511 Reliability and Maintainability of Electrical Systems 2Units

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. Fault 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.

EEE 519 Digital Signal Processing 3Units

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 ADC. Analytical tools: z-transform, properties, transfer function, inverse z-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 versus floating point DSP, Finite word length effects. DSP chips: interfacing and programming. Practical application of DSP in audio, and video.

ECT 513 JAVA Technology & Programming 2 Units

Java programming: Java basics, Java Applets and Applications, decisions and repetitions, arrays and strings, methods and parameters. Objects and classes, encapsulation and data hiding, data abstraction and abstract data types (ADTs), inheritance, polymorphism, abstract classes and design principles, java.awt and java.awt. event packages, buttons, labels, lists, text fields and panels, mouse events and keyboard events, scrollbars and layout managers. Basics of Java exception handling, try blocks, throwing an exception, catching an exception, throws clause, constructors, finalisers and exception handling, exceptions and inheritance, finally block. Thread methods, thread states, thread priorities and thread scheduling, thread synchronization, daemon threads, runnable interface, thread groups. Multimedia Applications: Loading, Displaying and Scaling Images, Introduction to Animation, Graphics Double Buffering, Media Tracker, Loading and Playing audio Clips, Customizing Applets, Image Maps. Network programming: Introduction, Manipulating URLS, Establishing a Simple Server, Establishing a Simple Client, Client/Server Interactions, Security and the Network.

ECT 515/ ICE 501 Mobile Communication & Network 3Units

Evolution of mobile radio communications. Examples of mobile radio systems: radio paging, cordless telephones, cellular radio. Trends in cellular radio and personal communications. A basic cellular system, Frequency reuse, Roaming, Hand-off strategies, Co-channel interference, Traffic and Grade of service, System capacity, Improving capacity of cellular system. Propagation path loss, multi-path propagation problem, Raleigh fading, Rician distribution. Doppler effect. Field strength prediction models, co-channel interference and reduction, adjacent channel interference, near-far problem. Standards and overview of analogue and digital cellular systems: AMPS, TACS, GSM, CT2, PCN, DECT, PHS. Frequency management and channel assignment, speech coding, channel coding, bandwidth consideration, equalization, modulation techniques, multiple access techniques. GSM: Architecture, elements, and standard interfaces; FDMA/TDMA structure; Speech and channel coding; time slots and bursts; signaling; hand-offs; DCS 1800; GPRS; data services over gsm. Third Generation Wireless Standard: convergence; UMTS; IMT-2000; CDMA2000; WCDMA; UWC-136; Network layer standards. Paging

services and technologies; Short Message Services. Call Processing: Signaling; Roaming and mobility management; Route optimization; Wireless Intelligent Networking; Databases; Protocols; Security and billing issues. Global Positioning System: principles, and applications.

ECT 516/ICE 502 Software Development Technique 3 Units

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, 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.

ICE 515 Project Management 2 Units

Management Concepts. Project organization, teams, methods and tools for project management. Organization constraints on development. Project Planning Objectives, Resources, **Project** Estimation, Cost Factors, Decomposition Techniques, Estimation Models. Risk Strategies, Risk Identification, Risk Projection, Risk Monitoring and Management. Work Breakdown Structure, Task Allocation/Effort Distribution. Network Diagrams, PERT and Critical Path Method, Gantt Chart. Scheduling Strategies. Project Tracking, Controlling Progress. Quality measurement. Linear Programming and PERT/CPM applications. System Engineering, Software Development Process, Software Life Cycle, Software Metrics and Measurement.

ECT 520 Telecommunication Software Development 3 Units

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. 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 (IEEE) 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: 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. Software development in C in MS Windows, UNIX/LINUX, MATLAB/Simulink environments, header file, preprocessor directives, make, makefile. Static and dynamic linking libraries. Extensive examples, and exercises programming in C and MATLAB/Simulink to solve practical problems in engineering. Exercises are to be done in the Computer Laboratory.

ECT 521 Cyberpreneurship & Media Law 2Units

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. AdvertisingCode:

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.

ECT 524/ICE 510 Computer Graphics & Animations 3 Units

Overview of 3D animation and its application and types. Coordinate system, vertex, faces and object. Concept of wireframe, surface and solid modeling. Construction planes and differences between object space and world space. Principles of making characters alive. Polygonal Modeling 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 & Animation 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 modeling. Render options and file output.

ICE 401/ECT 523 Computer Security Techniques 2 Units

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, Viaaccess, Videoguard, etc. Security and Legality Issues: Copyrights, Patents, Trade Secret, Ownership of Products, ComputerCrimes, Ethnical Issue in Computer Security.

ICE 504 Introduction to Enterprise Resource Planning Systems 3 Units

This course provides a technical overview of Enterprise Resource Planning Systems and their impact on organizations. Existing software package, such as SAP, should be used to illustrate the concepts, fundamentals, framework, general information technology context, the technological infrastructure, and integration of business enterprise-wide applications.

ECT 528/ICE 506 Design & Installation of Electrical & ICT services 3Units

Electrical Installation: Induction 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 designin 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.

ECT 532/ICE 508 Multimedia Technology & Programming 2Units

Introduction: Multimedia state-of-the art, impact of multimedia, technology, and applications. Multimedia Components: Text, data, audio, image, video. Text: Text compression and decompression. Text coding and decoding. Multi-languages. Unicode. Data: Framing of data. Segmentation of data frames. Data formats, data encryption, data recovery, data representation and manipulation. Audio: Audio creation and encoding. Audio recording format, mono and stereo. Audio compression. Real-time audio. Audio streaming technique. Voice recognition. Image: Image formats, image color scheme, image enhancement, image processing techniques, image compression, scale of compression, multiple images, animation. Video: Video recording formats and standards, resolution, compression, video streaming techniques. Multimedia Systems: Integration, storing and presentation of multimedia. Comparison of analogue anddigital recording. System integration and coordination. Real-time recording and transmission.Error recovery. Video conferencing systems: configuration, functions, transmission, technology. Multimedia over the networks: Hypertext: concepts. Hypertext Markup Language (HTML).

HTML programming and multimedia document design. An introduction to XML. Uniform Resource Locators (URL). Protocols: HTTP, FTP, SMTP. Common Gateway Interface (CGI) processing. MIME specification. Script language. Platform independent language, bytecode and interpreter. Multimedia application over the Intranet and the Internet.

ICE 509 Research Methodology 1 Unit

Foundations of research; problem identification and formulation; research design; qualitative and quantitative research; measurement; sampling; data analysis; interpretation of data and technical

report writing; use of encyclopedias, research guides, handbook etc., academic databases for computing discipline; use of tools/techniques for research: reference management software, software for detection of plagiarism.

ECT 533/ICE 513 Random Processes & Queue Theory 2Units

Review of probability: Basic concepts. Conditional and total probability. Distribution anddensity functions. Random variables: single and multiple variables. Mean variance and moments.Basic concepts, definition, and classification of random processes. Stationary process andindependence property. Autocorrelation and correlation functions. Ergodicity. Power densityspectrum. Linear systems. Hilbert Transforms. Noise modelling. Linear system response to random signal. Narrowband, band-limited and bandpass processes. Optimum linear systems:matched filter for white noise and coloured noise, Wiener filters, minimum mean-squared error.Optimization by parameter selection. Poisson points and renewals. Queueing theory. Shot noise.Markov processes. Applications of random signal theory in communications: AM system andnoise performance, FM system and noise performance, noise in a phase-locked loop, radardetection: false alarm probability and threshold detection probability.

ECT 534 Telecommunication Systems Planning 2 Units

FDT, Modulation Plan, High Order PCMCCITT Requirement Delta Modulation And ADPM, Different Type Systems Co-Operation Integrated Network, Network Planning.

ECT 535/ICE 407 Data Structures & Algorithm 2 Units

Data Types and ADT: Data types, Arrays & Pointers, Data structures, ADTs & implementation, objects, classes. Programming language support for ADTs. Data Structures: stacks: implementation & linked stacks. Recursion: Backtracking & Look-Ahead. Queues: circular, linked. Polynomial arithmetic. List and strings. Searching and Sorting: “Big O” notation. Sequential search, binary search, comparison trees, Insertion sorts, election sort, shell sort, quicksort, mergesort, Radix sort & Heapsort. Hashing. Analysis of these searching and sorting techniques. Trees: Binary trees. Traversal of binary tree. Binary search trees: Insertion and deletion & building binary trees. Height balance. Multiway trees. Polish Notation. Graph ADT, Graph traversal, depth-first & breadth-first algorithms. Shortest Paths, best-first, uniform-cost traversals.

EEE 531 Introduction to Nanotechnology 2Units

Nanotechnology is the engineering of functional systems at the molecular scale. This course attempts to explain what nanotechnology is and why is it important? Manipulation of physical

and chemical properties change of atoms. Constructing electronic, telecommunication circuits at nanoscale: nanomaterials, nanoelectronics and MEMS (micro-electro-mechanical systems) devices. Benefits of nanotechnology.

EEE 532 Object-Oriented Design and Programming 3 Units

Basic Object-Oriented Programming (OOP) concepts: Classes, Objects, inheritance, polymorphism, Data Abstraction, tools for developing. Compiling, interpreting and debugging, Java programs, Java syntax and data objects, operators. Central flow constructs, objects and classes programming, Arrays, methods. Exceptions, Applets and Abstract, OLE, Persistence, Window Toolkit. Basic engineering circuits' design using OOP.

EEE 539 Telecommunication Engineering 2 Units

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.

ECT 590 Project 6 Units

This course lasts for one academic session. Each student must undertake a project under the supervision of a lecturer, submit a comprehensive project report and present a seminar at the end of the year. A project status report is to be presented at the end of the first semester. Each student must attend Engineering Seminars.

ECT 598 Seminar

Independent research findings into selected areas/topics of interest to the academic staff. Students will be required to carry out literature survey on the topics, perform experiments and produce short reports (preferably at the end of second semester). Students will be subjected to both seminar and oral examination on the projects undertaken.

ICE 511 Final Year Project I 3 Units

Final year students' individual or group projects in one of the several areas of Information and Communication Technology, under the supervision of the academic staff of the Department or School. These independent projects may involve literature research, design, fabrication, construction or feasibility studies. The student is required to plan and carry out the project under the supervision of academic member of staff. A formal report of the project is required at the end of the second semester. The student is required to present his/her results orally before a panel of examiners.

ICE 512 Final Year Project II **3 Units**

Final year students' individual or group projects in one of the several areas of Information and Communication Technology, under the supervision of the academic staff of the Department or School. These independent projects may involve literature research, design, fabrication, construction or feasibility studies. The student is required to plan and carry out the project under the supervision of academic member of staff. A formal report of the project is required at the end of the second semester. The student is required to present his/her results orally before a panel of examiners.

ECE 526 Robotic & Automation **2 Units**

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.