



Departmental Handbook

Computer & Info. Sciences

(Computer Science & Info. Tech)

Faculty of Basic Medical and Applied Sciences
(FBMAS)



TRINITY UNIVERSITY
1 FFF Road, Off Alara Street, Sabo, Yaba
Lagos State, Nigeria

Student's Handbook

DEPARTMENT OF COMPUTER AND INFORMATION
SCIENCES
Faculty of Basic Medical and Applied Sciences (FBMAS)

Table of Contents	i
WELCOME NOTE FROM THE HEAD OF DEPARTMENT	1
AIMS, VISION, MISSION, and PHILOSOPHY	2
OUR AIMS	2
OUR VISION	2
OUR MISSION STATEMENT	2
OUR PHILOSOPHY	2
BRIEF HISTORY OF THE DEPARTMENT	4
OBJECTIVES OF THE DEPARTMENT	4
ADMISSION AND GRADUATION REQUIREMENTS	5
UTME	5
COURSES AND COURSE DESCRIPTIONS	6
POLICY ON ACADEMIC PROGRESSION OF STUDENTS	8
PREAMBLE	8
a. GOOD STANDING	8
REPETITION OF COURSE	9
Probation	9
Withdrawal or Transfer to a new programme	9
Transfer of Students from Other Universities	10
Late Registration of Courses	10
Carry- Over Courses	11
Duration of Degree Courses	11
STUDENT’S PERFORMANCE EVALUATION	12
GRADUATION REQUIREMENTS	13

CLASS OF DEGREE.....	13
ADMINISTRATIVE STRUCTURE OF THE DEPARTMENT	15
a. Staff Welfare	16
b. Staff Profile	16
COURSE OUTLINE	20
COMPUTER SCIENCE OPTION	20
COURSE OUTLINE	45
INFORMATION TECHNOLOGY OPTION	45
COURSE OUTLINE	45
INFORMATION TECHNOLOGY OPTION	45
COURSE DESCRIPTION	57
LINKAGES AND COLLABORATIONS	79
PENALTIES FOR EXAMINATION MISCONDUCTS...	79

WELCOME NOTE FROM THE HEAD OF DEPARTMENT

The Department runs Bachelor of Science, (B.Sc.) degree programme in Computer Science and Information Technology. One of the major goals of the Department is the training of undergraduates with sound technical and trending IT skills needed for the actualization of broad development contemporary society. The Department currently has 9 academic staff, 3 non-academic staff and student strength totaling 55.

The department offers insightful and robust curriculum that cuts across almost every aspect of Computer Science leading to the award of a B.Sc. degree in Computer Science and Information Technology. This handbook is very useful as it describes the courses offered by the Department and also serves as a guide in planning undergraduate programme. Active and prospective students of the department could find this handbook as a useful guide-companion throughout their course of studies in the university.

AIMS, VISION, MISSION, and PHILOSOPHY

OUR AIMS

The Computer Science program aims to prepare students to design and create algorithmically complex software and develop new and effective algorithms to solve computing problems, design and implement software, and devise new ways to use computers.

OUR VISION

To be a centre for academic excellence, producing graduates that are able to cope in the challenging and fast changing field of computing.

OUR MISSION STATEMENT

To train computer science graduates both in character and learning on the application of computer science and technology in both public and private sectors of the country in particular and the world at large.

OUR PHILOSOPHY

Computer science and Information Technology is a practical field, based on the experiences of the renowned academics of the department. It is a general belief in the department, that students

should have a hands-on experience in working through problems by building software systems rather than just theoretical treatment academic course contents. The department abides on a long workable teaching tradition, “Teach practice before theory!”. Theory in a vacuum would generally bore the students. Therefore, in order to avoid boredom, use of several inductive examples prove easier for the students to generalize knowledge gains. Moreover, impact of a hands-on experience tends to stay for a much longer time. Consequently, the course content for this program is kept as flexible as possible. For example, students can have the option of pursuing a bigger project instead of doing multiple smaller ones. Given the subjective nature of evaluation of projects, careful attention is paid to the evaluation criterion. Students are evaluated progressively over the semester through assignments, projects and quizzes rather than just through tests. In more advanced courses like practical programming courses, tests may totally be replaced with writing a research paper or a major software development project. As the world gets increasingly networked, the role of a traditional teaching method may decrease to some extent. However, it is our belief that a lecturer would still need to play the key role of inculcating curiosity in learning the various concepts and techniques and show the joy of exploring the various topics without necessarily focusing on end results. In this regard, the university has provided quality state of the art teaching and research infrastructure with well-equipped laboratories.

BRIEF HISTORY OF THE DEPARTMENT

The proposal for the establishment of the department of Computer and Information Sciences was approved and implemented in November 2019 exactly one month after the inauguration of the University in October 2019. The department was created out of the University's mission to train man power need to carter for the increasing and changing demands for solving computerization problems in the country and the world at large. Academic activities initially kick started with admission and subsequent enrolment of the five (5) pioneering student in the 2018/2019 academic session.

OBJECTIVES OF THE DEPARTMENT

Equation Chapter (Next) Section 1The objectives of the Department are as follows: To create awareness in our students on the relevance of Computer science and Information Technology in solving technology-driven-societal problems emanating from industries, commerce and governance.

- ✚ To develop highly skilled and creative graduates to satisfy the manpower needs of the rapidly growing field of ICT and modern technology.
- ✚ To provide a platform and foundation for graduates to undergo contemporary researches in the field of Computer Science.
- ✚ To provide a nexus with which collaborative researches could be carried out by researchers in the University and other Universities and Research institutions both within and outside the country.

- ✚ To fulfil the vision and mission of the University by creating linkage programmes with other universities and research institutions within and outside the country.
- ✚ To promote the culture of learning in school through E-learning and providing distance education with national contents.

ADMISSION AND GRADUATION REQUIREMENTS

Candidates wishing to enroll in the B.Sc. Degree Programme of the Department must obtain at least “O” level Credit passes in English Language, Mathematics, Physics, plus two other subjects from Chemistry, Geography, Agricultural science, and Economics in the Senior Secondary Certificate Examination (SSCE).

UTME

Candidates **MUST** have sat for and passed the UTME conducted by JAMB. Subjects to be taken in JAMB should include English Language, Mathematics, Physics and any one from Chemistry Geography, Economics, and Agricultural Science.

Direct Entry

To qualify for DE admission, candidates **MUST** obtain any of the following from a government recognized institution or others recognized by the Senate of Trinity University:

- ✚ Two “A” level passes in science subjects including Mathematics and one from Physics, Economic, Geography Chemistry.
- ✚ NCE with at least a Merit Pass in Mathematics and one other Science or Social Science subject.
- ✚ Diploma in Data Processing with at least a Merit Pass from a recognized University, or ND/HND in Data Processing, Engineering and Mathematics with an overall “B” Grade from a recognized Polytechnic may be considered.
- ✚ ND/HND (Upper Credit) in relevant fields (Mathematics, Statistics and Computer Science).

The academic certificates shall be admissible only if obtained from institutions recognized by the Senate of Trinity University Applications to the Direct Entry Programme shall be made through the JAMB.

COURSES AND COURSE DESCRIPTIONS

There are six categories of courses for the undergraduate degree programme of the Trinity University, namely:

a. General Studies Courses

These enhance students’ capacities in various fields of study, which includes communication skills, arts and humanities, social and behavioral sciences, quantification and natural sciences.

b. **Major/Core Courses:** These are mandatory courses in the students' main fields of study. These should account for not less than 70% of credits earned.

c. **Required/Ancillary Courses:** These are compulsory courses in related or relevant fields and should contribute not less than 15% of total credits earned.

d. **Elective Courses:** These are non-mandatory courses outside the student's major field of study designed to give the student basic principles of all major fields of knowledge as they exist in inter-relationship. These will account for not more than 10% of total credits earned.

e. **Optional Courses:** Courses which students can take, based on personal interest.

f. **Pre-requisite Courses:** Courses which a student must take and pass before a follow-up course at the same or higher level can be taken.

POLICY ON ACADEMIC PROGRESSION OF STUDENTS

PREAMBLE

The rating of a student's performance and categorization of the class of degree shall be based on the cumulative grade point average obtained by each candidate in all prescribed courses and approved electives taken at Trinity University.

a. GOOD STANDING

A candidate who has satisfactorily completed all requirements for the degree with an end of session Cumulative Grade Point average (CGPA) of not less than 1.50 and not more than 20 credit units of failed courses, shall be deemed fit to be in Good Standing (GS), and thus shall be promoted to the next academic level in the same course. A student with a CGPA less than 1.50 and more than 20 credit units of failed courses shall be considered Not in Good Standing (NGS). This Category of students shall be promoted to the next level, albeit on probation.

The existing class of honours degree are as indicated below:

First Class - 4.50 & above

2ndClass Upper - 3.50 - 4.49

2nd Class Lower - 2.40 - 3.49

Third Class - 1.50 -2.39

REPETITION OF COURSE.

A student may repeat only those courses in which he has obtained a grade F. The grade earned for

a repeated course will be recorded and used in the computation of the Grade Point Average (GPA)

in the usual way.

Probation

Probation is a status granted to a student whose academic performance fall below an acceptable standard. It serves as a warning to a student that his/her academic progress is not satisfactory. A student whose Cumulative Grade Point Average (CGPA) is below 1.50 with more than 20 credit units of failed courses at the end of a session, earns a period of probation for one academic session. The student could take lighter credit loads, provided the units are not less than 15 in a semester.

Withdrawal or Transfer to a new programme

A candidate whose CGPA is below 1.50 at the end of a particular period of probation will be required to withdraw from the University. However, in order to minimize waste of human

resources, consideration is given to withdrawal from programme of study and possible transfer to another programme in the University, bearing in mind the residency policy of the University. In the circumstance of a change of programme of study, the applicant must satisfy the Basic Entry Requirements (BER) for the new course.

Transfer of Students from Other Universities

A student may be considered for transfer from another University in Nigeria to Trinity University at 200 or 300 level of a similar programme for a 4-year or 5-year programme respectively, provided the candidate has attained a prescribed CGPA and other criteria prescribed by the Senate of the University.

Late Registration of Courses

The normal period within which all students must complete course registration formalities shall be two weeks from the date of commencement. Registration formalities that are not completed within the first two weeks shall be considered as late and will attract penalty fee unless acceptable reasons are given for the lateness.

Carry- Over Courses

A Student could retake the carry-over course(s) at the next available opportunity, provided that the total number of credit units carried during that Semester does not exceed 20, and the Grade Points earned at all attempts shall count toward the CGPA. At the point of registration of courses, the carry over courses must be registered first before additional/ core courses for the semester.

Duration of Degree Courses

To qualify for an honours degree, a student shall complete his/her degree requirements within the minimum period prescribed, or a period not exceeding two additional years beyond the prescribed minimum duration.

STUDENT'S PERFORMANCE EVALUATION

The students' performance in a course shall be evaluated through continuous assessment tests and course examination.

Continuous Assessment Marks

- Class test/Assignments 20%
- Mid Semester test/ Term Paper 20%
- Examination 60%

TOTAL

100%

Table 1.1: Student's Performance Grading System

Percentile Scores	Letter Grades	Grade Point (GP)
70-100	A	5
60- 69	B	4
50-59	C	3
45-49	D	2
0-44	F	0

GRADUATION REQUIREMENTS

An undergraduate full-time student will be required to register for a minimum of fifteen (15) credit units and a maximum of twenty-five (25) credit units per semester. The minimum total workload expected to be covered for the award of undergraduate qualification will be:

- a. A minimum of 96 credit units for a three-year degree programme.
- b. A minimum of 120 credit units for a four-year degree programme.
- c. Completed the standards for all compulsory and elective courses.
- d. Obtained a minimum CGPA of 1.50
- e. Met other requirements that may be prescribed by the Department, Faculty and Senate of the University.
- f. In partial fulfilment of the requirements for the award of a Bachelor's degree, the Bachelor's degree project will carry a minimum of 6 credit units.

CLASS OF DEGREE

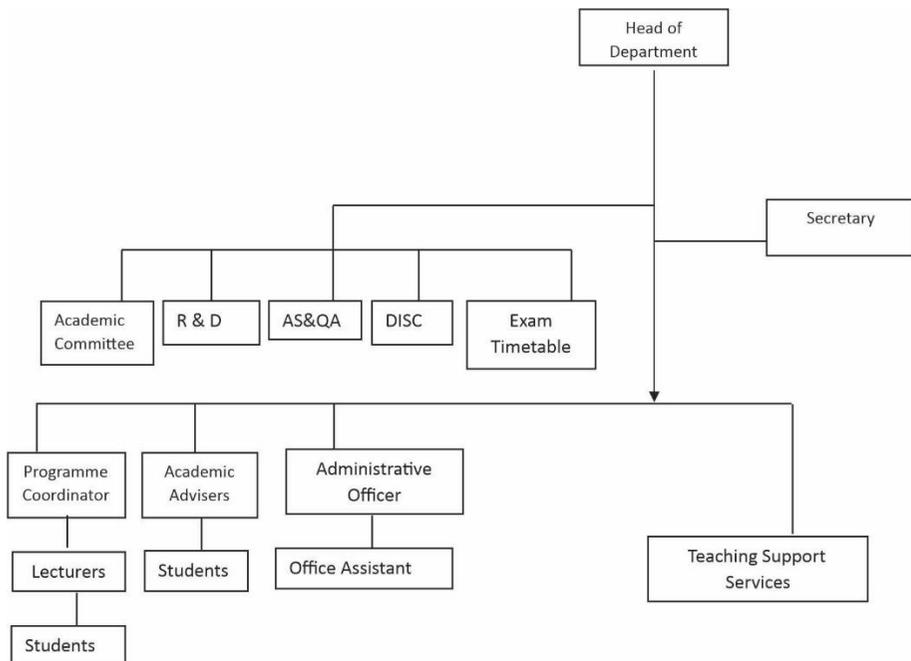
The determination of the class of degree shall be based on the Cumulative Grade Point Average (CGPA) earned at the end of the programme. The CGPA shall be used in the determination of

the class of degree as summarized in Table 1.2. It is important to note that the CGPA shall be calculated and expressed correct to two decimal places.

Table 1.2: Class of Degree Determination with CGPA

Cumulative Grade Point Average	Class of Degree
4.50- 5.00	First Class
3.50- 4.49	2nd Class Upper
2.50- 3.49	2nd Class Lower
1.50- 2.49	Third Class

ADMINISTRATIVE STRUCTURE OF THE DEPARTMENT



Keys:

- HOD - Head of Department
- R & D - Research and Development
- AS&QA - Academic Services and Quality Assurance
- DISC - Disciplinary Committee

Departmental decisions are taken collectively. Each level (Class) has attached to it lecturers, who are in charge of registration, welfare and counseling of students. The Head of Department liaises with the advisers and other staff in the running of the Department. In achieving this, some committees that address specific departmental issues have been constituted. They include Research and Development, Academic Services and Quality Assurance, Disciplinary, and Examinations Committee.

Students' Welfare

- The handling of academic grievances is as contained in the university examination academic regulations.
- Each level has a staff adviser
- There is also a registered student association under two staff advisers. The association is known as the Covenant University Strategic Students Association.

6. Staff Profiles

S/N	NAME OF LECTURER	QUALIFICATION	PROFESSIONAL STATUS	DESIGNATION	PROGRAMME SPECIALISATION
1	Prof. C. K. Ayo	Ph.D., M.Sc., B.Sc.	MNCS, MCPN, MCP, CCNA	Professor	Computer Science/ MIS
2	Dr. O. L. A. Ogunjimi	Ph.D., M.Sc., B.Sc.,	CS, MCPN, IEEE, ACM, BCS	Senior Lecturer/Head of Department.	Computer Science, Algorithm, AI
3	Dr. O. Olatinwo	Ph.D., M.Sc., B.Sc.,	MNCS, MCPN, IEEE, ACM.	Senior Lecturer	Computer Science, Software Engineering, Database Management, Information Security
4	Mr. P. A. Omosebi	M.Sc., B.Sc.	MNCS, MCPN	Lecturer II	Data Mining, Machine Learning, Web,

					Information Science
5.	Miss Azeez Titilayo	M.Sc, B.Sc	MNCS, MCPN	Lecturer II	Data Mining, Machine Learning.
VISITING LECTURERS					
1	OKESOLA, Julius Olatunji	Ph.D., M.Sc., B.Sc.,	MNCS, MCPN, IEEE, ACM,	Professor	Information System, Database Management and Cybersecurity
2	LONGE, Olumide Babatope	Ph.D., M.Sc., B.Sc.,	MNCS, MCPN, IEEE, ACM,	Professor	Information System, Database Management and Cybersecurity
3	AYANKOY A, Folasade	Ph.D., M.Sc., B.Sc.,	Part Time	Senior Lecturer	Computer Science
4	ONI, Aderonke	Ph.D., M.Sc., B.Sc.,	Part Time	Senior Lecturer	Computer Science
5	FALADE, Muritala Adesola	Ph.D., M.Sc., B.Sc.,	Part Time	Lecturer II	Computer Science
6	AZEEZ Olabisi Titilayo	M.Sc., B.Sc.,	Part Time	Lecturer II	Computer Science

TECHNICAL STAFF					
1	LUCAS, Akinola	Senior Technologist	HND, PGD Info. Tech		Senior Technologist
2	ONYEKW ERE, Ebuka Victor	Technologist II	B.Engr. Compute r Engineer ing		Technologist II
3	ADENIRA N Babatunde	Technologist II	OND, Compute r Science		Technologist II

ADMINISTRATIVE STAFF					
S/NO	Name of Staff	Rank/Designation Salary Scale and Date of First Appointment	Qualification and Dates Obtained	Post Qualification Work Experience	
1	Mrs. Blessing Onwuamah	Assistant Registrar / Departmental Officer (Computer and Information Sciences)	M.Sc. Guidance and Counselling, UNILAG (2019) PGDE Guidance and Counselling, UNILAG (2015) B.Sc. Biochemistry UNILAG (2008)	Assistant Registrar Trinity University 4 th January -Till date	
2	Mr Edwin Agbaike	Assistant Registrar / Departmental Officer (Computer	B.Sc. Accounting,	Assistant Registrar Trinity University 4 th January -Till date	

		and Information Sciences)	MBA	
3	Miss Deborah Akinpelu	Administrative Assistant (Computer and Information Sciences)	B.Sc. Microbiology	Administrative Officer
4	Miss. Sarah Edet	Administrative Assistant (Computer and Information Sciences)	OND Business Administration, Kogi State Polytechnic	Administrative Assistant Trinity University 24 th February –Till Date

COURSE OUTLINE

COMPUTER SCIENCE OPTION

100 Level

FIRST SEMESTER

Course Code	Course Title	Unit(s)
BIO 111	General Biology I	3
MTH 111	General Mathematics I	3
PHY 111	General Physics I	3
PHY 117	General Physics Practical I	1
CHM 111	General Chemistry I	3
CHM117	General Chemistry Practical I	1
GST 111	Communication in English I	2
GST 112	Use of Library & ICT	2
EDS 111	Introduction to Entrepreneurship	1
CSC 111	Introduction to Computer Science	3
STA 111	Statistics for Physical Science and Engineering	2
CIT 111	IT Certification	0
	Sub-Total	24

SECOND SEMESTER

Course Code	Course Title	Unit(s)
Compulsory CSC 121	Introduction to Problem Solving	3
CSC 125	Operating System I	3
MTH 121	General Mathematics II	3
MTH 122	General Mathematics III	2
PHY 121	General Physics II	3
PHY 129	General Physics Practical II	1
GST 121	Communication in English II	2
GST 123	Communication in French	2
GST 124	Contemporary Health Issues	2
EDS 121	Entrepreneurship Dev. Studies II	1
CIT 121	IT Certification	0
	Sub-Total	22
	Total	46

200 Level**FIRST SEMESTER**

Course Code	Course Title	Unit(s)
Compulsory		
CSC 211	Computer Programming, I	3
CSC 212	Fundamentals of Data Structures	3
CSC 213	Structured Programming	3
CSC 216	Foundation Of Sequential Programming & Parallel Computing	3
EDS 211	Entrepreneurship Development Studies III	1
MAT 211	Linear Algebra I	2
PHY 232	Electronics and Modern Physics	3
MTH 212	Mathematical Methods	3
GST 213	Peace and Conflict Resolution	2
	Sub-Total	23

SECOND SEMESTER

Course Code	Course Title	Unit(s)
Compulsory		
CSC 221	Computer Programming II	3
CSC 222	Computer Hardware	3
CSC 225	Discrete Structure	3
CSC 224	Computer Architecture and Organization I	3
CSC 226	Data Management I	3
CSC 227	Intro to Web Technologies	2
CSC 228	Introduction to Mobile Computing	2
EDS 221	Entrepreneurial Development Studies IV	1
GST 221	Environmental & Sustainable Devt.	2
GST 222	Leadership skills	2
	Sub-Total	24
	Total	47

300 Level**FIRST SEMESTER**

Course Code	Course Title	Unit(s)
Compulsory		
CSC 311	Object-Oriented Programming	3
CSC 312	Algorithms and Complexity Analysis	3
CSC 313	Systems Analysis and Design	3
CSC 314	Survey of Programming Languages	3
CSC 315	Computer Architecture and Organization II	3
CSC 316	Compiler Construction, I	3
CSC 317	Computational Science and Numerical Methods	3
CSC 318	Research Method	3
	Sub-Total	24

SECOND SEMESTER

Course Code	Course Title	Unit(s)
SIWES 312	Industrial Activities	2
SIWES 314	SIWES Visitation	2
SIWES 316	Technical Report and Log Book	1
SIWES 318	SIWES Seminar	1
	Sub-Total	6
	Total	30

400 Level

FIRST SEMESTER

Course Code	Course Title	Unit(s)
CSC 411	Organization of Programming Languages	3
CSC 419	Artificial Intelligence	3
CSC 414	Data Management	3
CSC 413	Software Engineering	3
CSC 415	Net-Centric Computing	3
CSC 432	Computer Networks/Communications	3
	Sub-Total	18

SECOND SEMESTER

Course Code	Course Title	Unit(s)
CSC 426	Modeling and Simulation	3
CSC 441	Formal Models of Computation	3
CSC 445	Introduction to Internet of Things	3
CSC 421	Distributed Computing System	3
CSC 428	Computer System Performance	3
CSC 499	Evaluation Project Report	6
	Sub-Total	21
	Total	39

COURSE DESCRIPTION

COMPUTER SCIENCE OPTION

CSC 111: INTRODUCTION TO COMPUTER SCIENCE (C) (1-2-0) (3 UNITS)

History of Computer Science and their generations. Computer Hardware; functional components Modern I/O units. Software: Operating Systems, Application Packages. Program: Development; Flow charts and algorithms; Program Objects BASIC or VISUAL BASIC Fundamentals.

CSC 121: INTRODUCTION TO PROBLEM SOLVING: (C) (1-2-0) (3 UNITS)

Problem solving strategies, Role of algorithm in problem solving process, implementations strategies, concepts and properties of algorithm.

CSC 211: COMPUTER PROGRAMMING I (C) (1-2-0) (3 UNITS)

Introduction to problem solving methods and algorithm development, designing, coding, debugging and documenting programmes using techniques of a good programming language style, programming language and programming algorithm development. A widely used programming language should be used in teaching the above.

CSC 212: FUNDAMENTALS OF DATA STRUCTURES (C) (2-1-0) (3 UNITS)

Primitive types, Arrays, Records Strings and String processing, Data representation in memory, Stack and Heap allocation, Queues, TREES. Implementation Strategies for stack, queues, trees. Run time Storage management; Pointers and References, linked structures.

CSC 213: STRUCTURED PROGRAMMING (C) (1-2-0) (3 UNITS)

Structured Programming elements, structured design principles, abstraction modularity, stepwise refinement, structured design techniques. Teaching of a structured programming language etc.

CSC 216: FOUNDATIONS OF SEQUENTIAL PROGRAM: (C) (1-2-0) (3 UNITS)

The relationships between H/L languages and the Computer Architecture that underlies their implementation: basic machine architecture, assembles specification and translation of P/L Block Structured Languages, parameter passing mechanisms.

CSC 221: COMPUTER PROGRAMMING II (C) (1-2-0) (3 UNITS)

Principles of good programming, structured programming concepts, Debugging and testing, string processing, internal searching and sorting, recursion. Use a programming language different from that in CSC 211. e.g., Python.

CSC 222: COMPUTER HARDWARE (C) (1-2-0) (3 UNITS)

Computer circuits; diode arrays, PIAs etc, Integrated circuits fabrication process. Use of MSI, LSI and VLSI IC' hardware Design. Primary and Secondary memories; core memory, etc. Magnetic devices; disks, tapes, video disks etc. Peripheral devices; printers, CRT's, keyboards, character recognition. Operational amplifiers; Analog-to- digital and Digital-to-Analog converter. Analog computers.

CSC 224: COMPUTER ARCHITECTURE AND ORGANIZATION I (C) (1-2-0) (3 UNITS)

Fundamental building blocks, logic expressive immunization, sum of product forms. Register transfer notation, Physical considerations. Data representation, and number bases, Fixed and Floating-point systems, representation memory systems organization and architecture.

CSC 226: DATA MANAGEMENT I (C) (1-2-0) (3 UNITS)

Information storage & retrieval, Information management applications, Information capture and representation, analysis & indexing, search, retrieval, information privacy; integrity, security; scalability, efficiency and effectiveness. Introduction to database systems: Components of database systems DBMS functions, Database architecture and data independence use of database query language.

CSC 225: DISCRETE STRUCTURE (C) (1-2-0) (3 UNITS)

Logic(propositional logic, logical equivalence, predicates & quantifiers, and logical reasoning),Sets (basics, set operations), Functions (one-to-one, onto, inverse, composition, graphs), Integers (greatest common divisor, Euclidean algorithm), Sequences and Summations, Mathematical reasoning (Proof strategies, Mathematical Induction, Recursive definitions, Structural Induction), Counting(basic rules, Pigeon hall principle, Permutations and combinations, Binomial coefficients and Pascal triangle), Probability(Discrete probability. Expected values and variance) Relations (properties, combining relations, Closures, Equivalence, partial ordering) Graphs (directed, undirected graphs)

CSC 227: WEB TECHNOLOGIES (R) (1-1-0) (2UNITS)

Broadly examines the key technologies and programming models of the web and its underlying Internet infrastructure including client-side technologies such as HTML, CSS and Javascript, content formats and server-side technologies such as web and application servers, database back ends, client-server programming model, communication protocols such as http and tcp/ip. Students should also be introduced to content creation with client-side technologies and time permitting, some basic database driven application using a familiar application framework.

CSC 228: INTRODUCTION TO MOBILE COMPUTING (1-2-0) (2 Units)

Wireless technologies: cellular, WiMax, WiFi, Bluetooth, 802.15.4, ad hoc networks, Basic network properties: capacity and connectivity, Wireless protocols: CSMA/CA, 802.11, MobileIP, Mobility models, ARM and Thumb instruction set architectures, processors: XScale, ARM11, i.MX bus and memory architectures, I/O architectures, SOC designs, battery models, energy models and relative energy consumption of components, voltage and frequency scaling, sleep and wakeup algorithms, cooperative energy conservation.

CSC 311: OBJECT-ORIENTED PROGRAMMING (C) (1-1-0) (2UNITS)

Basic 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 the Abstract, OLE, Persistence, Window Toolkit, Laboratory exercises in an OOP Language.

CSC 312: ALGORITHMS AND COMPLEXITY ANALYSIS (C) (2-1-0) (3 UNITS)

Basic algorithmic analysis: Asymptotic analysis of Upper and average complexity bounds; standard Complexity Classes Time and space trade-offs in algorithms analysis recursive algorithms. Algorithmic Strategies: Fundamental computing algorithms: Numerical algorithms, sequential and binary search algorithms; sorting algorithms, Binary Search trees, Hash tables, graphs & its representation.

CSC 313: SYSTEMS ANALYSIS AND DESIGN (C) (1-2-0) (3 UNITS)

System Concept; System Development Life Cycle Analysis: Fact gathering Techniques, data flow diagrams, Process description data modeling. System Design: Structure Charts, form designs, security, automated Tools for design.

CSC 314: SURVEY OF PROGRAMMING LANGUAGES (C) (1-2-0) (3 UNITS)

Overview of programming languages: History of programming languages, Brief survey of programming paradigms (Procedural languages, Object-oriented languages, Functional languages, Declarative – non-algorithmic languages, Scripting languages), the effects of scale on programming methodology; Language Description: Syntactic Structure (Expression notations, abstract Syntax Tree, Lexical Syntax, Grammars for Expressions, Variants of Grammars), Language Semantics (Informal semantics, Overview of formal semantics, Denotation semantics, Axiomatic semantics, Operational semantics); Declarations and types: The concept of types, Declaration models (binding, visibility, scope, and lifetime), Overview of type-checking, Garbage collection; Abstraction mechanisms: Procedures, function, and iterations as abstraction mechanisms, Parameterization mechanisms (reference vs. value), Activation records and storage

management, Type parameters and parameterized types, Modules in programming languages; Object oriented language paradigm; Functional and logic language paradigms.

CSC 315: COMPUTER ARCHITECTURE AND ORGANIZATION II (C) (1-2-0) (3 UNITS)

Memory system, general; characteristics of memory operation. (Technology-magnetic recording semi-conductor memory, coupled devices, magnetic bubble). Memory addressing, memory hierarchy, virtual memory control systems. Hardware control, micro programmed control, Asynchronous control, i/c control. Introduction to the methodology of faulty tolerant computing.

CSC 316: COMPILER CONSTRUCTION I (R) (1-2-0) (3 UNITS)

Review of compilers assemblers and interpreters, structure and functional aspects of a typical compiler, syntax semantics and pragmatics, functional relationship between lexical analysis, expression analysis and code generation. Internal form of course programme. Use of a standard compiler (FORTRAN<COBOL/PL) as a working vehicle. Error detection and recovery. Grammars and Languages: the parsing problem.

CSC 317: COMPUTATIONAL SCIENCE AND NUMERICAL METHODS (R) (1-2-0) (3 UNITS)

Operations research, Numerical Computation, Graphical computation, Modeling and simulation, High performance computation

CSC 318: RESEARCH METHOD (C) (0-2-0) (2 UNIT)

Introduction to Research and the Research Process, Research Ethics and Integrity, Critical appraisal, Introduction to

Quantitative Research, Study Designs and Methods, Analysis and Interpretation of Quantitative Data Lesson, Critical Appraisal of Quantitative Research, Introduction to Qualitative Research, Study Designs and Methods, Analysis and Interpretation of Qualitative Data Critical Appraisal of Qualitative Research, Introduction to Mixed Methods Research, Study Designs and Methods, Analysis and Interpretation of Mixed Methods Data, Critical Appraisal of Mixed Methods Research

SIWES 321: INDUSTRIAL ACTIVITIES (C) (2UNITS)

Students would be attached to Industries for a Period of Six Months. Students would be Expected to Receive Sufficient Practical Training in their Respective Fields under Industry Based Supervisors. The Employer is expected to assist the Students' Performance during the Period of Attachment.

SIWES 322: SIWES VISITATION (C) (2UNITS)

Supervisors from the University shall pay visits to the Student on Industrial Attachment before the expiration of The SIWES exercise. During the Course of the Visitation, Lecturers shall interact with the Students and their Industrial Based Supervisors. It is Recommended that Lecturer from Student's Disciplines or Related Discipline Should Be Assigned to Supervised Students on Industrial Attachment. On Rare Occasions when Students cannot be supervised due to Logistic Reasons, such Students Shall Be Assessed at the Department under the Supervision of the Head of Department and the SIWES Unit Shall be notified.

SIWES 323: TECHNICAL REPORTS & LOG BOOK (C) (1 UNITS)

This Shall Normally Be divided into Two Parts:

PART A:

Each Student in Industrial Attachment is expected to have a Copy of the 'Log Book' which is used to Keep Daily/Weekly Records of Activities Undertaken while in The Industry. The Entries in the Log Book Should Be Detailed Enough, Written in Legible and Simple English. It Must Be Endorsed Daily/Weekly by The Industry Based Supervisor and The University Based Visitor. This Aspect Shall Carry a Total of 65 Marks.

PART B:

On Completion of the Industrial Attachment, Students are required to submit a 'Technical Report' to their Respective Departments. This is expected to be a Concise Analysis of Job Done, Problems Encountered, Solution Proffered and Experience Acquired During the Period of Industrial Attachment. This Aspect Shall Carry a Total of 35 Marks.

SIWES 324: SIWES SEMINAR (C) (1 UNITS)

This is The Final Aspect of The SIWES Assessment where Students will be expected to Formally Present their Report and Share Experiences at a Departmental Seminar. All Participating Students are Expected to give a Verbal Presentation of all they did and Suggest Answers to Questions Raised. This Shall be Done not Later than One Month after the Completion of the SIWES Program. This Exercise is a Very Important Requirement as it Shows the Depth of Understanding of The Experience Gained during the Period of Attachment.

CSC 411: ORGANIZATION OF PROGRAMMING LANGUAGES: (C) (1-2-0) (3 UNITS) Language definition structure. Data types and structures, Review of basic data types, including lists and tress, control structure and data flow, Run-

time consideration, interpretative languages, lexical analysis and parsing. Pre-requisite – CSC 211, 212,314, 312.

CSC 413: SOFTWARE ENGINEERING: (C) (1-2-0) (3 UNITS)

Software Design: Software architecture, Design Patterns, O. O. analysis & Design, Design for re-use. Using APIS: API programming Class browsers and Related tools, Component based computing. Software tools and Environment: Requirement's analysis and design modeling Tools, Testing tools, Tool integration mech.

CSC 414: DATA MANAGEMENT II (C) (1-2-0) (3 UNITS)

Rational Databases: Mapping conceptual schema to relational Schema; Database Query Multi-Languages (SQL) Concept of Functional dependencies & Valued dependencies.
Transaction processing; Distributed databases.

CSC 415: NET- CENTRIC COMPUTING (C) (1-2-0) (3 UNITS)

Language Preliminaries, Introduction to ASP.NET, .NET Core Applications, HTTP and ASP.NET Core, Creating ASP.NET core MVC applications, Working with Database, State Management on ASP.NET Core Application, Client-side Development in ASP.NET Core, Hosting and Deploying ASP.NET Core Application

Laboratory works: The laboratory work includes writing programs covering most of the concepts of above units using C# and .NET core SDK (3.0 or above)

CSC 426 QUEUING SYSTEMS: (C) (1-2-0) (3 UNITS)

Introduction; Birth-death queuing systems; Markovian queues, the queue M/GI bounds, inequalities and approximations.

CSC 417: SPECIAL TOPICS IN SOFTWARE ENGINEERING (C) (1-2-0) (3 UNITS)

Topics from process improvement; software re-engineering configuration management; Formal specification, software cost – estimation, Software Architecture, Software patterns, Software Reuse and Open-source development.

CSC 418: COMPUTER SYSTEM PERFORMANCE EVALUATION (C) (1-2-0) (3 UNITS)

Measurement techniques, simulation techniques; techniques, workload characterization, performance evaluation in selection problems, performance evaluation in design problems, evaluation of programme performance.

CSC 419: ARTIFICIAL INTELLIGENCE: (C) (1-2-0) (3 UNITS)

Introduction to artificial intelligence, understanding natural languages, knowledge representation, expert systems, pattern recognition, the language LISP.

CSC 416: COMPILER CONSTRUCTION II (C) (1-2-0) (3 UNITS)

Grammars and languages, recognizers, Top-down and bottom-up language Run-time storage Organization, The use of display in run-time storage Organization. The use of display in run time storage allocation. LR grammars and analysers. Construction of LR table. Organisation of symbol tablets. Allocation of storage to run-time variables. Code generation. Optimisation/Translator with systems.

CSC 421: PROJECT MANAGEMENT (C) (1-2-0) (3 UNITS)

Team Management, Project Scheduling, Software measurement and estimation techniques, Risk analysis, Software quality

assurance, Software Configuration Management, Project Management tools.

CSC 432: COMPUTER NETWORKS/COMMUNICATION (C) (1-2-0) (3 UNITS)

Introduction, waves, Fourier analysis, measure of communication, channel characteristics, transmission media, noise and distortion, modulation and demodulation, multiplexing, TDM FDM and FCM Parallel and serial transmission (synchronous Vs asynchronous). Bus structures and loop systems, computer network Examples and design consideration, data switching principles broadcast techniques, network structure for packet switching, protocols, description of network e.g. ARPANET, etc.

CSC 424: DISTRIBUTED COMPUTING SYSTEMS ((C) (1-2-0) (3 UNITS)

Introduction: Definitions, Motivation; Communication Mechanisms: Communication Protocols, RPC, RMI, Stream Oriented Communication; Synchronization: Global State, Election, Distributed Mutual Exclusion, Distributed Transactions; Naming: Generic Schemes, DNS, Naming and Localization; Replication and Coherence: Consistency Models And Protocols; Fault Tolerance: Group Communication, Two-And Three-Phase Commit, Check pointing; Security: Access Control, Key Management, Cryptography; Distributed File Systems: NFS, Coda etc.

CSC 445 INTRODUCTION TO INTERNET OF THINGS. (1-2-0) (3 UNITS)

1. Introduction to IoT; 2. Software Analysis and Tooling Week; 3. Network, Linking & Loading; 4. System Programming and OS Dependencies; 5. Cloud Computing Services; 6. Cloud and IoT Integration; 7. IoT Data and the Cloud Week; 8. Cloud Evolution.

CSC 433: COMPUTER GRAPHICS AND VISUALIZATION (C) (1-2-0) (3 UNITS)

Hardware aspect, plotters microfilm, plotters display, graphic tablets, light pens, other graphical input aids Facsimile and its problems Refresh display refresh huggers, changing images, light pen interaction. Two- and three-dimensional transformation, perspective Clipping algorithms. Hidden line removal bolded surface removal. Warnock's method, shading, data reduction for graphical input. Introduction to hand writing and character recognition. Curve synthesis and fitting. Contouring. Ring structures versus doubly linked lists. Hierarchical structures. Data structure: Organization for interactive graphics.

CSC 441: HUMAN-COMPUTER INTERFACE (HCI) (C) (1-2-0) (3 UNITS)

Foundations of HCI, Principles of GUI, GUI toolkits; Human-centred software evaluation and development; GUI design and programming.

CSC 451: CLOUD COMPUTING (C) (1-2-0) (3 UNITS)

1. Basic Concepts of Cloud Computing Computer Network Basics. Concepts of Distributed Systems. Concepts of Cloud Computing and its Necessity. Cloud Service Providers in use and their Significance. 2. Cloud Infrastructure Cloud Pros and Cons. Cloud Delivery Models. Cloud Deployment Models. 3. Cloud Storage Management Concept of Virtualization and Load Balancing. Overview on Virtualization used for Enterprise Solutions. Key Challenges in managing Information. Identifying the problems of scale and management in big data. 4. Building Cloud Networks Designing and Implementing a Data Center-Based Cloud Installing Open-Source Cloud service. Amazon Web Services (AWS). Google Cloud Platform. 5. Cloud Security Infrastructure Security Network level security, Host level

security, Application-level security. Data privacy and security Issues. Access Control and Authentication in cloud computing.

CSC 441 FORMAL MODELS OF COMPUTATION (C) (1-2-0) (3 UNITS)

Automata theory: Roles of models in computation Finite state Automata, Push-down Automata, Formal Grammars, Parsing, Relative powers of formal models. Basic computability: Turing machines, Universal Turing Machines, Church's thesis, solvability and Decidability.

CSC 482: COMPUTER SIMULATIONS (C) (1-2-0) (3 UNITS)

Basic Definitions and Uses, Simulation Process, Some basic statistic Distributions Theory, Model and Simulation. Queues; Basic components, Kendal notation, Queuing rules, Little's Law, Queuing networks, Special/types of queues. Stochastic Processes; Discrete state and continuous state processes, Markov processes, Birth- Death Processes, Poisson Processes. Random Numbers; types of Random Number Exercises.

CSC 492: SPECIAL TOPICS IN COMPUTER SCIENCE (C) (1-2-0) (3 UNITS)

Special topics from any area of computer science considered relevant at given time. Topics are expected to change from year to year. Apart from seminars to be given by lecturers and guests, students are expected to do substantial readings on their own.

CSC 499: PROJECT (6 Units)

This Shall Normally Be divided into Two Parts, part one in the first semester title project seminar carrying 3 units and part two in second semester titled Project report carrying 3 units.

Students would embark on work that will lead to substantial software development under the supervision of a member of staff.

BIO 111: GENERAL BIOLOGY I (C) (2-1-0) (3 UNITS)

Cell Structure and Organization; Functions of Cellular Organelles, Diversity, Characteristics and Classification of Living Things; General Reproduction; Interrelationship of organisms; Hereditary and Evolution; Elements of Ecology; Types of habitats.

BIO 121: GENERAL BIOLOGY II (C) (2-1-0) (3 UNITS)

A Generalized Survey of the Plant and Animal Kingdoms Based Mainly on Study of Similarities and Differences in the External Features; Ecological Adaptation of these Forms.

GENERAL STUDIES COURSES

GST 111 COMMUNICATION IN ENGLISH I (C) (1-0-1) (2 Units)

Effective Communication and Writing in English, Language Skills, Writing of Essay, Comprehension, Sentence Construction, Outline and Paragraphs, Collection and Organization of Materials and Logical Presentation; and Punctuation. Logical Presentation of Papers, Phonetics, Introduction on Lexis, Art of Public Speaking and Oral Communication, Figures of Speech and Report Writing

GNS 112: USE OF LIBRARY & ICT (C) (1-0-1) (2 Units)

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

technology; Software technology; Input devices; Storage devices; Output devices; Communication and internet services; Word processing skills (typing, etc).

GST 113: LOGIC PHILOSOPHY AND HUMAN EXISTENCE (1-0-1) (2 Units)

A brief survey of the main branches of Philosophy Symbolic Logic Special symbols in symbolic Logic-conjunction, negation, affirmation, disjunction, equivalent and conditional statements law of tort. The method of deduction using rules of inference and bi-conditionals qualification theory. Types of discourse, Nature or arguments, Validity and soundness; Techniques for evaluating arguments; Distinction between inductive and deductive inferences; etc. (Illustrations will be taken from familiar texts, Including literature materials, Novels, Law reports and newspaper publications).

GST 114: NIGERIAN PEOPLES AND CULTURE (C) (1-0-1) (2 Units)

Study of Nigerian history, culture and arts in pre-colonial times, Nigerian's perception of his world, culture areas of Nigeria and their characteristics, evolution of Nigeria as a political unit, indigene/settler phenomenon, concepts of trade, economic self-reliance, social justice, individual and national development, norms and values, negative attitudes and conducts (cultism and related vices, re-orientation of moral environmental problems).

GST 224: Leadership Skills: (1-0-1) (2 Units)

Transformation is a fundamental shift in the deep orientation of a person, organization or society such that the world is seen in new ways and new actions and results become possible that were impossible prior to the transformation. Transformation happens at the individual level but must be embedded in collective

practices and norms for the transformation to be sustained. Leadership Development Programme (LDP) proposes novel approaches to teaching and learning, which emphasizes the practical involvement of participants. It is interactive and involves exercises and actual implementation of breakthrough projects by teams that make difference in the lives of the target population. In this course, leadership concepts comprising of listening, conversation, emotional intelligence, breakthrough initiatives, gender and leadership, coaching and leadership, enrolment conversation and forming and leading teams will be taught

EDS 111 ENTREPRENEURSHIP DEV. STUDIES I (C) (1-0-0) (1 Unit)

The entrepreneurial courses are divided into two parts in the academic curriculum; general studies where students would be taught the basic concept of becoming a successful entrepreneur and specific studies, where students would choose a venture to develop their entrepreneurship skills on. Students will learn the “DO your Venture” ideology, which will teach them the common path entrepreneurs take, conceptual framework for evaluating opportunities, problem appreciation, development and testing of ideas and gathering customer feedbacks. They will also learn the tools and techniques for generating ideas such as lean Canvas.

EDS 121: ENTREPRENEURSHIP DEVELOPMENT STUDIES II (1-0-1) (2 Units)

This course will teach students to look at the world through the lens of problem discovery and problem solving. Students will explore problems that they see in their life’s and in the world and evaluate their potential for entrepreneurial innovation. Students will iterate toward solutions that are just right. Students will gain

a broad overview of entrepreneurship strategy with insights they can apply to their venture regardless of location, industry or venture stage. Students would also engage tools and strategies of entrepreneurial bootstrapping, and apply them to designing the strategy for diffusing user innovation and problem-solving using road maps.

**EDS 211: ENTERPRENEURSHIP DEV. STUDIES III (C)
(1-0-0) (1 Unit)**

Students would be grouped based on the skills they wish to learn. They would be taught practically on different vocational skills and students will present project works hand made by themselves in their respective vocation at the end of the semester.

**EDS 221: ENTERPRENEURSHIP DEV. STUDIES IV (C)
(1-0-0) (1 Unit)**

The course will provide students with an enhanced understanding of the role of people management in organizational context. In this marketing course, they will learn the fundamentals of marketing management, as they gradually learn advanced theories and applications through real world business examples, illustrations, cases and exercises. They will learn how marketing management tools can be used to increase customer base, improve customer satisfaction and increase company's overall perceived value.

**EDS 311: ENTREPRENEURSHIP DEV. STUDIES V (C)
(1-0-0) (1 Unit)**

This course will introduce students to the Design Thinking process and illustrate best practices for each step along the way. They will utilize everything they learn in this course to create their very own project. In doing so, they will learn many practical and applicable skills such as user research and rapid prototyping.

COURSE OUTLINE

INFORMATION TECHNOLOGY OPTION

100 LEVEL

Course Code	Course Title	Status	Units	Pre-Req uisit e
PHY111	General Physics I: Mechanics and Properties of Matter	C	3	
BIO112	General Biology I	C	2	
MATH111	General Mathematics I: Algebra, Trigonometry and Geometry	C	3	
PHY119	Physics Practical I	C	1	
CSC111	Introduction to Computer Science	C	3	
STA 111	Statistics I	C	2	
CHM111	General Physical Chemistry	C	3	
PHY119	Physics Practical I	C	1	
	Sub-Total		19	
EDS111	Entrepreneurial Development Studies I	C	1	
CIT111	Microsoft Office Specialist in WORD	C	0	
	Sub-Total		1	

GST112	Use of library and Studies Skill and Information Communication Technology I	C	2	
GST111	Communication in English I	C	2	
	Sub-Total		4	

100 LEVEL

SECOND SEMESTER				
Course Code	Course Title	Status	Units	Pre- Requisite
PHY121	General Physics II :Electricity, Magnetism, Atomic and Nuclear Physics	C	3	
MATH 121	General Mathematics II: Calculus	C	3	
MTH 122	General Mathematics III: Vector Algebra	C	2	
STA121	Statistics for Physical Science and Engineering	C	3	
CSC121	Intro. To Problem Solving	C	3	

	Sub-Total		17	36
EDS121	Entrepreneurial Development Studies II	C	1	EDS111
CIT121	Microsoft Office Specialist in EXCEL	C	0	CIT111
	Sub-Total		1	2
GST123	Logic, Philosophy and Human Existence	C	2	
GST 114	Nigerian People and Culture	R	2	
GST121	Communication in English II	C	2	GST111
	Sub-Total		6	10
	TOTAL		25	44

200 LEVEL

FIRST SEMESTER			
Course Code	Course Title	Status	Units
CSC211	Computer Programming, I	C	3
CSC213	Discrete Structures	C	3
CIT211	Introduction to Web Computing	C	3

CIT213	Fundamentals of Information Technology	C	3
CIT215	Information Technology in Business	C	2
GST213	Introduction to Entrepreneurship	R	2
	Sub-Total		18
<i>Note: Select minimum of 4 Units Electives</i>			
	Sub-total		2
EDS211	Entrepreneurial Development Studies III	C	1
CIT211	Java Foundations Certified Junior Associate	C	0
	Sub-Total		2
GST213	Logic, Philosophy and Human Existence	C	2
	Sub-Total		2

SECOND SEMESTER				
Course Code	Course Title	Status	Units	Pre- Requisite
CSC221	Computer Programming II	C	3	CSC121
CIT222	Introduction to Software Engineering	C	2	

CSC264	Human-Computer Interface (HCI)	C	2	
CIT224	System Analysis & Design for IT	C	3	
CIT226	Database Management	C	2	
MAT221	Linear Algebra I	C	2	
	Sub-Total		15	33
<i>Note: Select minimum of 5 units Electives</i>				
ECN202	Principles of Economics	E	3	
	Sub-Total		5	7
EDS221	Entrepreneurial Dev. Studies IV	C	1	EDS211
CIT221	Oracle Database: SQL Fundamentals	C	0	CIT211
	Sub-Total		1	3
GST221	Nigerian People and Culture	C	2	
GST222	Peace Studies and Conflict Resolution	C	2	

300 Level

FIRST SEMESTER				
Course Code	Course Title	Status	Units	Pre-Requisite
CSC310	Data Communications and Networking	C	3	
CIT311	Data Analysis	C	2	
CIT313	Data Structures and Algorithms	C	3	
CIT315	Operating Systems	C	3	
CIT317	Computer Organization and Architecture	C	3	
CIT319	Web Application Development	C	3	
	Sub-Total		117	
<i>Note: Select minimum 2 units from these Electives</i>				
CIT312	Web Server Administration	E	3	

CIT331	Database Programming	E	3	
CIT332	Program Design and Data Structures	E	3	
CIT351	Network Security I	E	3	
CIT352	Network Servers and Infrastructures	E	3	
CIT371	Information Defense Technologies	E	3	
CIT372	Computer Crime, Forensics, and Auditing	E	3	
	Sub-Total		2	
EDS321	Entrepreneurial Development Studies V	C	1	
	Sub-Total		1	
	Sub-Total		1	
	TOTAL		21	

SECOND SEMESTER	Course Title	Unit(s)
Course Code		
SIWES 312	Industrial Activities	2
SIWES 314	SIWES Visitation	2
SIWES 316	Technical Report and Log Book	1
SIWES 318	SIWES Seminar	1
	Sub-Total	6
	Total	27

400 LEVEL

FIRST SEMESTER				
Course Code	Course Title	Status	Units	Pre-Requisite
CIT 411	IT Project Development and Management	C	3	
CIT 413	Mobile & Pervasive Computing	C	3	
CIT 415	Integrative Programming & Technologies	C	3	
CIT 417	Enterprise System	C	2	
CIT 419	Research Methodology in IT	C	2	
CIT 431	Mobile Application Development	C	2	
CIT 499	Final Year Student's Project	C	6	
	Sub-Total		21	
<u>Note:</u> Select 4 units Elective				

CIT 412	Mobile Development	E	3	
CIT 431	Database Administration	E	3	
CIT 432	Network Security II	E	3	
CIT 451	Information Storage and Management Technologies	E	3	
	Sub-Total		7	
EDS41 1	Entrepreneurial Development Studies VII	C	1	EDS311
	Sub-Total		1	
	TOTAL		18	

SECOND SEMESTER				
Course Code	Course Title	Status	Units	Pre-Requisite
CIT 422	Applied Networks & Security	C	3	
CIT 423	Information Assurance and Security	C	3	
CIT 426	System Administration and Management	C	3	
CIT 428	Social and Professional Issues in IT	C	2	
CIT 420	System Integration & Architecture	C	3	
CIT 442	Special Topics in Information Technology	C	3	
	Sub-Total		14	
<i>Note: Select 2 units Elective</i>				
CIT 424	Web Development using Content Management Systems	E	3	
CIT 425	Data & Application Security	E	3	
CIT 427	Wireless Communications & Networking	E	3	
	Sub-Total		2	

EDS42 1	Entrepreneurial Development Studies VIII	C	1	EDS411
	Sub-Total		2	
	TOTAL		17	

COURSE DESCRIPTION

INFORMATION TECHNOLOGY OPTION

100 LEVEL - FIRST SEMESTER

PHY 111 Mechanics and Properties of Matter (3 Units)

Units and dimensions, scalar and vectors, particle kinematics, Newton's laws, friction, work, energy, center of mass, simple harmonic motion, rigid body dynamics, Kepler's laws, pressure in fluids, intermolecular forces, Hooke's law, Young modulus, fluid flow streamline turbulence, Stoke's law surface tension.

PHY119: Physics Practical I (1 Unit) PH: 45

Simple experiments illustrating the topics covered in PHY111 and PHY112; these include demonstration of simple harmonic motion using simple pendulum, center of mass, moment of a force, elasticity, heat flow, wave propagations, formation of images in mirrors and lenses, interferences, diffraction grating etc.

BIO 112: Cell Biology (2 Units)

Cell structure and organization, functions of cellular organelles, diversity, characteristics and classification of living things, general reproduction, interrelationship of organisms; heredity and evolution, elements of ecology and types of habitats.

MATH 111: General Mathematics I (3 Units)

Part I: Elementary Algebra: Algebra of set theory: Definition of concepts, laws of algebra of sets, Venn diagram and application. Real Number: Rational numbers, theory of surd, sequences and series (including AGP), binomial theorem, theory of quadratic, cubic and quadratic equations, indices and logarithms, mathematical induction, partial fractions, theory of

equations, inequalities and polynomials (including factor and remainder theorems). Complex Numbers: algebra of complex numbers, Argand diagram, multiplication and division of numbers in polar form, n^{th} root of unity, and Demoware's theorem, expansion of $\text{Sin } n\theta$, $\text{Cos } n\theta$, $\text{Tan } n\theta$.

Part I: Trigonometry and Geometry

Trigonometry and analytic geometry in (2-D & 3-D): Elements of trigonometry, circular measure, elementary treatment of circles, coordinate geometry: straight lines in (2B-D); plans. functions and relations: permutation and algebra of functions, binary operations, permutation and combination, elementary treatment of logic.

CSC 111: Introduction to Computer Science (3 units)

Definition of computer science. History of computer science and their generations, computer hardware; functional components, modern I/O units. software: operating systems, application packages program: development; flowcharts and algorithms; program object; BASIC or VISUAL BASIC fundamentals.

CHM119: General Chemistry Practical I (1 Unit)

PH: 45

Practice in weighing and measurement of volume, preparations of standard solutions. Titrimetric: acid-base, oxidation-reduction, precipitation and complex metric titrations; gravimetric analysis.

EDS111: Entrepreneurial Development Studies I (1 Unit)

LH: 15, PH: 45

Approach: resource persons will be drawn from the academics and industries as a way of bridging the gap between town and gown. Students are exposed to actual industrial environment.

CIT111: Microsoft Office Specialist on Microsoft Office 2013 in WORD LH: 15

Create and manage documents, format text, paragraphs, and sections, create tables and lists, apply references, insert and format object.

GST 112: Use of library and Studies Skill and Information Communication Technology (2 Units)

100 LEVEL – SECOND SEMESTER

PHY 121: General Physics II (3 Units)

Part I: Electricity and Magnetism: Electricity, Coulomb's law, Ohm's law. Gauss's theorem, capacitors, Kirchhoff's laws, Electrical energy, DC, Bridges potentiometer, Magnetic effect of current, Electromagnetic induction, Moving coil and ballistic galvanometers, multi-meters, DC and AC motors, and generators, hysteresis, power in AC circuits, semiconductors, conductivity and mobility, rectification.

Part II: Atomic & Nuclear physics: Theory of atomic structure. Thompson, Rutherford and Bohr's theories, the hydrogen atom. Properties of nucleus, Natural radioactivity, wave particles duality of light, X-rays, Photo-electricity, Thermionic emission, Diode valve.

MATH 121: General Mathematics II: Calculus (3 Units)

Functions of real-variables: Graph, limits, and concepts of continuity. Techniques of differentiation of algebraic and trigonometric functions, higher order derivatives, maxima and minima, Leibnitz rule, application of differentiation. Integration as inverse of differentiation, methods of integration, definite integral. Application to areas, volume, moment of inertia. Approximate integration: Trapezoidal and Simpson's rule. Taylor's and Maclaurin's theorems, partial differentiation and implicit differentiation.

MATH 122: General Mathematics III: Vector Algebra (2 Units)

3-D Cartesian coordinate systems. Definition and representation of vectors; Algebra of vectors: multiplication of a vector by a scalar, addition of vectors, scalar product of two vectors, vector product of two vectors, direction cosines, calculus of vector function: differentiation of vector function, integration of vector function; conic: circles, parabola, ellipse and hyperbola; kinematics of a Particle: basic concepts, motion under constant acceleration, motion under variable acceleration: rectilinear motion, motion in a plane. Force.

PHY122: Physics Practical II (1 Unit) PH: 45

A selection of experiments to illustrate the principles covered in PHY121 and PHY122. These include electrostatics, the use of potentiometer, DC and Wheatstone bridges, galvanometers, multi-meters, DC and AC motors, Millikan's experiment, etc.

CSC 121: Introduction to Problem Solving (3 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

EDS121: Entrepreneurial Development Studies I (1 Unit)

LH: 14, PH: 45

Prerequisite: EDS111

Topics covered include the following: generating entrepreneurial ideas and translating same with action, the source and approaches to the study of entrepreneurship, constraints of launching business, youths and money management, investment, introduction to capital market, classification of entrepreneurs, economic importance of entrepreneurship, entrepreneurial windows, factors that influence entrepreneurship. The practice of entrepreneurship productivity, salaried employment Vs entrepreneurship, introduction to marketing management, forms of business organizations, their advantages and disadvantages. Introduction to International Trade, students are also expected to submit a term paper on entrepreneurship from some selected areas of Small and Medium Scale Enterprises (SMEs) operations.

CIT121: Microsoft Office Specialist on Microsoft Office 2013 in EXCEL LH: 15

Create and manage worksheets and workbooks, create cells and ranges, create tables, apply formulas and functions, create charts and objects.

CST 121: Use of library and Studies Skill and Information Communication Technology II (2 Units)

Spreadsheet: principle of operation, application, demonstration and practical hand-on exercises in spreadsheet using a popular

spreadsheet package. Database management: principle of operation, application, demonstration and practical hand-on exercises in using a popular relational database management package. Report presentation software package: principle of operation, application, demonstration and practical hand-on exercises in using a popular report presentation package such as Power Point package. Mini-project to test proficiency in use of the software packages.

GST121: Communication in English II (2 Units)

LH: 30, TH: 8

Prerequisite: GST111

This course focuses on introducing basic aspects of English grammar, developing effective reading and writing skills across disciplines, style in communication, revision and self-editing strategies; skills for eliciting information from simple literary text, survey of the Nigerian and African literary tradition.

CSC 211: Computer Programming I (3 Units)

Introduction to problem solving methods and algorithm development, designing, coding, debugging and documenting programmes using techniques of a good programming language style, programming language and programming algorithm development. A high-level programming language that supports object-oriented, structured and even some level of functional programming principles should be used in teaching the above.

CSC 213: Discrete Structure (3 Units)

Basic Set Theory: Basic definitions, relations, equivalence relations partition, ordered sets. Boolean algebra and lattices, logic, graph theory: directed and undirected graphs, graph isomorphism, basic graph theorems, matrices: integer and real

matrices, Boolean matrices med m , path matrices. Adjacency vectors/matrices: Path adjacency matrix, numerical & Boolean adjacency matrices. Applications to counting, discrete probability generating functions.

CIT 201: Introduction to Web Computing (3 Units)

An introduction to the Internet, the World Wide Web, and web development. Students will create interactive web pages by writing HTML and CCS and by programming in JavaScript. Topics include the origins of the web, the roles and operations of web browsers and web servers, interacting with web applications through forms, and using style sheets to separate document structure formatting, introduction to digital media.

CIT 203: Fundamental of Information Technology (3 Units)

Pervasive themes in information technology; information technology systems model; a gentle introduction to information technologies – human–computer interaction, information management; networking, platform technologies, programming, and web systems and technologies; data versus information; history of information technology and internet; information technology and its related and informing disciplines; information technology application domains.

CIT 205: Information Technology in Business (2 Units)

An overview of e-business from design to operations of organizations engaging in the fast-paced highly competitive, global environment of e-commerce. e-Business, strategic use of

information technology for competitive advantage, e-business impact on organization, globalization, and the impact on options created through applied information technology.

GST 223: Introduction to Entrepreneurship (2 Units)

Introductory entrepreneurial skills. Relevant concepts: enterprise, entrepreneur, entrepreneurship, business, innovation, creativity, enterprising and entrepreneurial attitude and behavior. History of entrepreneurship in Nigeria. Rationale for entrepreneurship, Creativity and innovation for entrepreneurs. Leadership and entrepreneurial skills for coping with challenge. Unit operations and time management. Creativity and innovation for self-employment in Nigeria. Overcoming job creation challenges. Opportunities for entrepreneurship, forms of businesses, staffing, marketing and the new enterprise. Feasibility studies and starting a new business.

200 LEVEL SECOND SEMESTER

CSC 221: Computer Programming II (3 Units)

Principles of good programming, structured programming concepts, debugging and testing, string processing, internal searching and sorting, recursion. Use a programming language different from that in CSC 201 e.g., C# or VB.net

CIT 222: Introduction to Software Engineering (3 Units)

Introduction to software engineering techniques, methodologies and process models, specification modelling, requirements analysis and definition, agile software development, software design, quality assurance, testing, development tools and

environments and software engineering ethics; introduction to software management; dependability and security assurance.

CSC 264: Human-Computer Interface (HCI) (2 Units)

Foundations of HCI, principles of GUI, GUI toolkits, human-centered software evaluation and development, GUI design and programming.

CIT 224: System Analysis and Design for IT (3 Units)

This course presents a structured approach to analysis and design of information systems for businesses. Software development life cycle; structured top-down and bottom-up design, dataflow diagramming, entity relationship modelling; study of computer aided software engineering, input and output, prototyping design and validation, file and database design; design of user interfaces; comparison of structured and object-oriented design. Case studies that promote critical-thinking skills provide the context for these techniques.

CIT 226 Database Management (2 Units)

Database concepts; file systems and databases, relational database model; design concepts and implementation: entity relationship modelling; normalization of database tables, structured query language; database design and implementation; introduction to transaction management and concurrency control, distributed database management systems; database privacy, security, failure and recovery. Some emerging topics in databases.

MTH 221: Linear Algebra I (2 Units)

Pre-requisite -MTH 101,102

Co-requisite -MTH 213

Vector space over the real field. Subspaces, linear independence, basis and dimension. Linear transformations and their representation by matrices - range, null space, rank. Singular and non-singular transformation and matrices. Algebra of matrices.

ECN202: Principles of Economics (3 Units)

An introduction to the various issues, the nature of economic science; the methodology of economics, major areas of specialization in economics, stressing the historical development of ideas; major findings in the various areas of specialization; elementary principles of micro and macro-economics, current issues of interest and probable future developments.

CSC310: Data Communications and Networking (3 Units)

This course examines computer networks and data communication. Topics include: network services and applications: DNS, HTTP, peer-to-peer systems, socket programming; network transport architectures, TCP, UDP, TCP congestion control, routing and forwarding, intra-domain and inter-domain routing algorithms; Link layers and local area networks, especially Ethernet and WiFi; As time permits: software-defined networking and network function virtualization; the Internet of Things (IoT); multimedia communications and quality of service; network measurement, inference, and management; network experimentation and performance analysis; network security; protocol verification.

CIT311: Data Analysis (2 Units)

Introduction to the basic concept of probability theory, common distribution functions, moments of distribution functions, the foundation of statistical analysis, sampling distribution of moments, statistical tests and procedures, linear regression and correlation analysis, the design of experiments, least squares. Laws of large numbers and the central limit theorem, random walk, Markov Chains, introduction to Poisson process.

CIT313: Data Structures and Algorithms (3 Units)

Stacks, linked lists, trees, priority queues, search trees, sorting, hashing, garbage collection, storage management, maps and dictionaries, text processing, graphs. Introduction to algorithms and their importance, mathematical foundations: growth functions, complexity analysis of algorithms, summations, recurrences, sorting algorithms. Algorithm design: divide-and-conquer approach, greedy approach. graph algorithms and its applications in games. String matching. Dynamic programming and longest common sequence. Theory of NP-completeness.

CIT315: Operating Systems (3 Units)

History of operating systems, operating system concepts and structure. Processes (communication and scheduling), memory management, input/output and file systems. Protection and security. History, design principles, kernel modules, installation and maintenance of Unix-like operating systems such as Linux: survey of the operating system facilities and commands. Process management, scheduling, memory management file system, input/output, network structure and security. Effective use of the operating system tools for writing shell scripts and batch files,

pattern matching, editing, macro processing, data analysis and text processing.

CIT317: Computer Organisation and Architecture (3 Units)

Basic structure of computers, performance evaluation: metrics and calculations, performance equations, Amdahl's law, instruction set architectures, introduction to computer arithmetic, CPU design and architecture, pipelining and instruction level parallelism, the memory subsystems – memory hierarchy, caches and cache hierarchies, cache organizations, cache performance, compiler support for cache performance, main memory organization, virtual memory, TLBs. Input and output organizations.

CIT319: Web Applications Development (3 Units)

Prerequisite – CIT201

Introduction to framework-based web development. Students create interactive, dynamic web sites using a common web architecture and object-based database access. Programming for web development includes control structures, objects, functions, and use of composite data types.

EDS311: Entrepreneurial Development Studies V (2 Units)

Profiles of business ventures in the various business sectors. Soap/detergent, tooth brush and tooth paste making, photography, brick making, rope making, brewing, glassware production/ceramic production, paper production, water treatment/conditioning/packaging, food processing/preservation/packaging, metal fabrication, vegetable oil extraction, farming, fisheries/aquaculture, plastic making,

refrigeration/air-conditioning, carving, weaving, bakery, tailoring, printing, carpentry, interior decoration, animal husbandry, etc. Case study methodology applied to the development and administration of cases that bring out key issues of business environment, start-up, pains and gains of growth of businesses, etc. with particular reference to Nigerian businesses. Experience sharing by business actors in the economy with students during case presentation.

300 LEVEL SECOND SEMESTER

CIT399: Student Industrial Work Experience Scheme (SIWES) (6 Units)

Students are attached to private and public organizations for a period of six months with a view to making them acquire practical experience and to the extent possible, develop skills in all areas of computing. Students are supervised during the training period and shall be expected to keep records designed for the purpose of monitoring their performance. They are also expected to submit a report on the experience gained and defend their reports.

300 LEVEL ELECTIVES

CIT312: Web Server Administration (3 Units)

Covers the installation, configuration, and administration of web servers, FTP servers, and DNS servers. Additional topics include security setups, administration, and associated performance issues.

CIT 331: Database Programming (3 Units)

The course introduces students to the Oracle application development utilities and tools and describes how to create and manipulate databases in Oracle database management system. The course provides an extensive overview of SQL and introduction to PL/SQL. Topics include data definition and manipulation languages, stored procedures, triggers, indexing techniques, and elementary query optimization.

CIT 332: Program Design and Data Structures (3 Units)

Fundamentals of data structures and analysis of algorithms. Large programs written in a modern, high-level programming language. Stresses abstraction, modular design, code reuse, and correctness.

CIT 341: Network Security I (3 Units)

Examines information security services and mechanisms in network context. Topics include symmetric and asymmetric cryptography; message authentication codes, hash functions and digital signatures; digital certificates and public key infrastructure; access control including hardware and biometrics; intrusion detection; and securing network-enabled applications including e-mail and web browsing.

CIT 342: Network Servers and Infrastructures (3 Units)

Covers IP networking concepts and practices for IPv6 addressing, DHCP and DNS in IPv6 networks, secure communication over VPNs, VoIP architecture, virtual computing, cloud computing, MPLS, traffic monitoring and network connectivity between operating systems. Students learn the latest technologies of IP networks and understand

application-level services used in the Internet. Lab sessions focus on installation of applications on virtual servers.

CIT 351: Information Defence Technologies (3 Units)

This course will examine and assess the role of information technology as a tool of warfare and civil defense. Topics will be discussed from both defensive and offensive perspectives and will include asset tracking, asymmetric warfare, network centric warfare, physical attacks, cyberterrorism, espionage, psyops, reconnaissance and surveillance, space assets, and applications of GPS and cryptographic technology. Students will research and write about the social, ethical, and political effects of such technology.

CIT 352: Computer Crime, Forensics, and Auditing (3 Units)

Covers computer crime, relevant laws, agencies, and standards. Presents auditing, logging, forensics, and related software. Explores legal principles such as chain of evidence, electronic document discovery, eavesdropping, and entrapment. Students get hands-on experience with forensics tools.

400 LEVEL – FIRST SEMESTER

CIT 411: Information Technology Project Development and Management (3 Units)

Planning, design, selection, and project management of information technology systems. Development of requirements, configuration of hardware and software, management of the procurement and implementation process, performance requirements, contract negotiation, and legal issues within a comprehensive project; project monitoring and control, project

audits, project closure, peer review, stress testing, quality planning, defect estimation and quality assurance, information technology project management methods and tools. Student will develop a tool-kit for creating a project plan for a distributed application, and engage in a project to improve information technology project management capabilities of a globally distributed information systems organization systematically.

CIT: 413 Mobile and Pervasive Computing (3 Units)

Definitions and motivations: mobile, pervasive and ubiquitous computing; physical interaction; theoretical foundations of pervasive computing: context-aware interaction, resource and device constraints; implementing pervasive systems: sensor, actuators, embedded systems, applications, programming languages and approaches, device types and choices; capturing needs and requirements for pervasive systems: techniques and challenges; multi-sensory communication using pervasive computing. Introduction to cloud computing technologies and its services. A practical application of mobile and cloud computing.

CIT 415: Integrative Programming and Technologies (3 Units)

Scripting techniques – scripting and the role of scripting languages, creating and executing scripts, and influence of scripting on programming; integrative coding – design patterns, interfaces, and inheritance; software security practices – evidence-based security versus code access security, authentication to system resources and services, and encryption of data between systems and services; data mapping and exchange; intersystem communications – architectures for integrating systems, DCOM, CORBA, RMI, web services and middleware.

CIT 417: Enterprise Architecture (2 Units)

Information technology infrastructure and the systems that support the operational, administrative and strategic needs of an organization. The design, selection, implementation and management of enterprise information technology solutions. Frameworks and strategies for infrastructure management, distributed computing, middleware, legacy system integration, system consolidation, software selection, total cost of ownership calculation, information technology investment analysis, and emerging technologies. Managing risk and security within audit and compliance standards.

CIT 419: Research Methodology in IT (2 Units)

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.

CIT 431: Mobile Application Development (2 Units)

Introduction to developing mobile applications, beginning with mobile operating systems capabilities and application architecture and extending to major components, such as activities, services, broadcast receivers, etc. Development of interactive applications using widget libraries, web-based services, animation, an SQL database engine, and multithreading.

CIT 499: Final Year Student's Project (6 Units)

An independent or group investigation of appropriate software, hardware, communication and networks or information technology related problems in information technology be carried out under the supervision of a lecturer. Before registering, the student must submit a written proposal to the supervisor to review. The proposal should give a brief outline of the project, estimated schedule of completion, and computer resources needed. A formal written report is essential and an oral presentation may also be required.

400 LEVEL – SECOND SEMESTER

CIT 422: Applied Networks and Security (3 units)

This course introduces the networking and security technologies required to build and maintain a home or small-office network. Networking topics will include client/server application software configuration, network connectivity (cabling, switch and router configuration), basic IP addressing, network address translation and options for public Internet access services. Security topics will include typical threats and responses, firewalls, host hardening, password management and virtual private networks. The course has a laboratory component where students apply wired and wireless technologies to design and administer a small network with various applications.

CIT 423: Information Assurance and Security (2 units)

History and terminology, security mindset, design principles, system/security life-cycle, security implementation mechanisms, information assurance analysis model, disaster recovery, and forensics; security mechanisms—cryptography, authentication, redundancy, and intrusion detection; operational

issues—trends, auditing, cost/benefit analysis, asset management, standards, enforcement, legal issues; policy—creation of policies, maintenance of policies, prevention, avoidance, incident response (forensics), and domain integration (physical, network, internet, etc.); attacks – social engineering, denial of service, protocol attacks, active and passive attacks, buffer overflow attacks, and malware; security domains—security awareness and possible domains.

CIT 426 – System Administration and Management (3 units)

Content management, content deployment (file system planning and structure), server administration and management, user and group management, backup management, security management, disaster recovery, resource management, automation management (automatic job scheduling), site management notebooks and documents, system support, user support and education; administrative domains – web domain, network domain, database domain, operating systems domain, and support domain; secure installation; removing unnecessary components; file system maintenance (isolation of sensitive data); user restrictions (access and authorizations); user/group/file management; password standards and requirements; shutting down unnecessary/unneeded services; closing unnecessary/unneeded ports; patch management/software updates; virtualization; vulnerability scanning.

CIT 428: Social and Professional Issues (2 units)

Professional communications; teamwork concepts and issues; social context of computing – social informatics, social impact of information technology on society, online communities and

social implications, philosophical context, diversity issues, gender-related issues, cultural issues, accessibility issues, globalization issues, economic issues in computing, and digital divide; intellectual property – foundations of intellectual property, ownership of information, plagiarism, software piracy, fair use, digital millennium copyright act, copyrights, patents, trademarks and trade secrets, international differences; legal issues in computing; organizational context; professional and ethical issues and responsibilities – relationships with professional societies, codes of professional conduct, ethics and history of ethics, whistle-blowing, workplace issues (harassment, discrimination), identify theft, ethical hacking; privacy and civil liberties.

CIT 420: System Integration and Architecture (3 units)

System architecture, testing, evaluation and benchmarking, contracts and RFPs, and quality; system integration and deployment, system release: pilot and acceptance testing and defect repair, system support strategies and user support plans, and enterprise integration approaches, standards, and best practices; testing and quality assurance.

CIT 442: Special Topics in Information Technology (3 units)

Recent topics and developments in information technology are expected to be introduced from year to year. Apart from seminars to be delivered by lecturers or guests, students are expected to do substantial readings on their own.

400 LEVEL ELECTIVES

CIT 421: Mobile Development (3 Units)

Studies business-oriented applications for popular mobile platforms including Blackberry, Android and Apple. Provides overview of mobile platforms and devices including evaluation, uses, design and development of applications.

CIT 425: Web Development using Content Management Systems (3 Units)

Through lectures and hands-on lab experience, presents web development techniques using content management systems (e.g. Joomla, Dot net nuke). Introduces characteristics of various types of websites (corporate portals, intranets and extranets; online magazines, newspapers, and publications; e-commerce and online reservations, government applications, small business websites). Presents methods, languages, tools related to web content management systems from an applied perspective.

CIT 431: Database Administration : (3 Units)

Explores advanced concepts of database administration using enterprise-level database management system. Topics include: backup, recovery, corruption, automatic management, resource management, job scheduling, space management, memory management, storage management, diagnosis and corresponding tools.

CIT 425: Data and Application Security (3 Units)

Introduces concept of data and application security. Discuss challenges of database, and application and industrial control system security.

CIT 432: Network Security II (3 Units)

Detailed study of certain symmetric and asymmetric cryptographic schemes; analysis of network data (including “packet sniffing”); security at different network layers (including IPsec, SSL/TLS and Kerberos); and secure e-commerce. Teaches principles of designing and testing secure networks, including use of network partitioning, firewalls, intrusion detection systems, and vulnerability assessment tools.

CIT 427 - Wireless Communications and Networking (3 Units)

Covers fundamental principles underlying wireless data communications. Topics include wireless transmission basics, radio propagation issues, antennas, digital modulation, spread spectrum techniques and their applications, and popular standards: WiFi, WiMAX and Bluetooth. Also presents practical knowledge to enable the design, testing, deployment, debugging and commissioning of WiFi, WiMAX networks and point-to-point microwave systems. Discussions on cellular network technologies are also included.

CIT 451: Information Storage and Management Technologies (3 Units)

Provides an introduction to principles of information storage and management including the emerging field of virtualization technologies. Covers Direct Attached Storage (DAS), networked storage models such as Network Attached Storage (NAS), Storage Area Network (SAN), and Content Addressed Storage (CAS); and applications in business continuity, replication, disaster recovery, and cloud computing. Includes exposure to real-world storage networking technologies.

LINKAGES AND COLLABORATIONS

The University has an outstanding MoU with some notable Research Institutes in Nigeria, namely:

S/N	ORGANISATION	STATUS
1	Educational Advancement Centre	MoU
2	Commit Technology and Consult Ltd.	MoU
3	New Horizon Systems Solution Ltd.	MoU
4	Edustart Global Foundation	MoU
5	Nigeria Employers' Consultative Association (NECA)	Registered Member
6	Nigerian Association of Small and Medium Enterprises (NASME)	Registered Member

Table: Penalties for Examination Misconducts

S/N	Misconducts	Penalties
1.	Possession/copying of any written materials relevant to the examination, tests and assignments.	Rustication for two semesters.
2.	Impersonation	Expulsion

3.	Plagiarism	Rustication for one semester.
4.	Unauthorized access to examination materials	Expulsion
5.	Unauthorized collection of items from another student during an examination without the knowledge of the invigilator	Letter of caution
6.	Falsification of evaluation form and other academic records or documents	Expulsion
7.	Appearing for examination, without meeting attendance requirement	Letter of caution and prevention from writing the examination.
8.	Disobedience to instructions/ disruption during an examination/harassment of invigilator	Disqualification from the examination.
9.	Harassment of Invigilators	Rustication for one semester.
10.	Anti-safety behaviour during practical, workshops, studio work, etc.	Letter of caution
11.	Attempted inducement of examiners and invigilators	Disqualification from the examination
12.	Aiding and abetting examination misconduct	Expulsion.

13.	Destruction of evidence of examination misconduct	Rustication for one semester
14.	Refusal to complete examination misconduct form	Rustication for one semester.
15.	Any previous arrangement made for access to examination materials whether it succeeds or not	Rustication for two semesters.
16.	Refusal to submit examination scripts	Failure in the examined course.
17.	Any other misconduct recorded from time to time	Penalty shall be determined based on the recommendation of the panel.



+234 703 216 6707

+234 703 216 7003

Trinity University City Campus,
Off Alara Street, (Near Queen's College)
Sabo, Yaba,
Lagos.