1.0 Name of the Programme: B.Sc Information Technology

Programme Code: 5202

1. **Entry Requirements**

To be admitted for the B.Sc Information Technology programme, a candidate is expected to:

1. i) Have at least five credits in SSC, GCE 'O' level or 6 merits in NABTEB or TC II examinations. The credit passes must include Mathematics and Physics while at least a pass in English language is required.

1. Have the NCE level examination with merit pass in mathematics in addition to a credit pass in any other science subject preferably Physics or Chemistry for entry into 200 level of the programme
2. Have GCE Advance level in mathematics and physics or OND/HND in addition to (i) above for consideration into 200 level of the programme.

3.0 Aim sand Objectives

The B.Sc Information Technology programme is designed to equip the undergraduate students with the basic requirements for serving in a professional capacity in most areas of computing as well as well as develop knowledge in the theory of applied mathematics. The degree programme would explore all the basic rudimentary or foundation knowledge of Information technology not known to most of today's information users. It is also expected to equip students with the tools for computational techniques and thinking, as they would be exposed to the fundamentals of computing processes and principles.

1. **Aim**

The B.Sc. Information Technology Programme is aimed at taking you through the fundamental of the science of Information Technology and the latest technologies that make Information Technology an all-round catalyst in the design of any new market driven communication devices.

3.2 Objectives

After completing this programme, the grandaunts are expected to:

- Be able to interact with various communication devices characterizing today's workplace.

- Be able to design communication networks suitable for various organizations.
- Also be able to manage data transmission procedures and security parameters and controls
- Be able to administer various topologies for effective communication networks.

1. **Programme Structure and Degree Rules**

4.1 **Outline of Course Structure**: The B. Sc., honours, Information Technology programme is structured in 8 semesters as shown below. However a 6 semester structure can be attempted if the entry level is at the 200 year level.

100 Level			
Course Code	**Course Title**	**Unit**	**Status**
1st Semester			
GST 101	Use of English and Communication Skills I	2	C
GST103	Computer Fundamentals	2	C
GST 107	The Study Guide for the Distance Learner	2	C
BIO101	General Biology I	2	C
CHM101	Introductory Inorganic Chemistry	2	C
CHM103	Introductory Physical Chemistry	2	C
CIT 143	Introduction Data Organisation and Management	2	C
MTH 101	Elementary Mathematics I	3	C
MTH 103	Elementary Mathematics III	3	C

PHY 101	Elementary Mechanics, Heat and Properties of	2	C
	Matter		
BIO191	General Practical Biology I	1	C
CHM191	Introductory Practical Chemistry I	1	C
PHY 191	Introductory Practical Physics I	1	C
	Total Credit Units – Compulsory	**25**	
	Total Credit Units – Elective	**0**	
	Total Credit Units	**25**	
2nd Semester			
GST 102	Use of English and Communication Skills II	2	C
GST104	Use of Library	2	C
CHM102	Introductory Organic Chemistry	2	C
CIT 102	Software Application Skills	2	C
CIT104	Introduction to Computer Science	2	C
STT102	Introductory Statistics	2	C
MTH 102	Elementary Mathematics II	2	C
BIO102	General Biology II	2	C
BIO192	General Biology Practical II	1	C
CHM192	Introductory Practical Chemistry II	1	C
PHY 102	Electricity, Magnetism and Modern Physics	3	C
PHY 192	Introductory Practical Physics II	1	C
	Total Credit Units – Compulsory	**22**	
	Total Credit Units – Elective	**0**	
	Total Credit Units	**22**	

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200 Level

Course Code	Course Title	Unit	Status
1st Semester			
GST 201	Nigerian Peoples and Cultures	2	C
GST203	Introduction to Philosophy and Logic	2	C
CIT 211	Introduction to Operating Systems	3	C
CIT 215	Introduction to Programming Languages	3	C
CIT 237	Programming & Algorithms	3	C
MTH 211	Introduction to Set Theory and Abstract Algebra	3	C
MTH 213	Numerical Analysis I	3	C
MTH 281	Mathematical Methods I	3	E

	Total Credit Units – Compulsory	**19**
	Total Credit Units – Elective	**3**
	Total Credit Units	**22**
	N/B: Students are expected to offer at least	

	one elective		
	course per semester.		
	Maximum credit units allowed per semester is		
	25		
2nd Semester			
GST 202	Fundamentals of Peace Studies and Conflict	2	C
	Resolution		
GST204	Entrepreneurship and Innovation	2	C
CIT 208	Information Systems	2	C
CIT 212	Systems Analysis and Design	3	C
CIT 236	Analog and Digital Electronics	3	C
CIT 292	Computer Laboratory I	2	C
MTH 212	Linear Algebra II	3	C
MTH 232	Elementary Differential Equations	3	C
MTH 282	Mathematical Methods II	3	E
PHY 208	Network Analysis and Devices	3	E
	Total Credit Units – Compulsory	**18**	
	Total Credit Units – Elective	**6**	
	Total Credit Units	**24**	
	N/B: Students are expected to offer at least one elective		
	course per semester.		
	Maximum credit units allowed per semester		

	is
	25

300 Level

Course Code	Course Titles	Units	Status
1st Semester			

CIT 303	Principles of Communication Technology	3	C
CIT 305	Networking and Communication Technology	3	C
CIT 309	Computer Architecture	3	C
CIT 311	Computer Networks	3	C
CIT 341	Data Structures	3	E
CIT 371	Introduction to Computer Graphics and Animation	3	E
CIT381	File Processing and Management	3	E
CIT389	Industrial Training/SIWES	6	C

	Total Credit Units – Compulsory	**18**	
	Total Credit Units – Elective	**9**	
	Total Credit Units	**27**	
	N/B: Students are expected to offer at least one elective		
	course per semester.		
	Maximum credit units allowed per semester is 25		
2nd Semester			
GST302	Business Creation and Growth	2	C
CIT 322	Introduction to Internet Programming	3	E
CIT 342	Formal Languages & Automata theory	3	C
CIT 344	Introduction to Computer Design	3	C
CIT 392	Computer Laboratory II	2	C
DAM 301	Data Mining and Data Warehousing	3	C

DAM344	Semantic Data Modelling	2	E
DAM 364	Management Information Systems (MIS)	2	C
DAM382	Information Systems Management	3	E
	Total Credit Units – Compulsory	**15**	
	Total Credit Units – Elective	**8**	
	Total Credit Units	**23**	
	N/B: Students are expected to offer at least one elective		
	course per semester.		
	Maximum credit units allowed per semester is 25		

400 Level

Course Code	Course Titles	Units	Status
1st Semester			
CIT 403	Seminar on Emerging Technologies	3	C
CIT 411	Microcomputers & Microprocessors	2	C
CIT 415	Introduction to E-commerce	3	E
CIT 427	Database Systems & Management	3	C
CIT 445	Principles & Techniques of Compilers	3	E
CIT 461	Internet Architecture & Communication	3	C
CIT 463	Introduction to Multimedia Technology	3	E
CIT 465	Network Administration	2	C

	Total Credit Units – Compulsory	**13**	
	Total Credit Units – Elective	**9**	
	Total Credit Units	**22**	
	N/B: Students are expected to offer at least one elective		
	course per semester.		
	Maximum credit units allowed per semester is		
	25		
2nd Semester			
CIT 425	Operations Research	3	C
CIT			

474	Introduction to Expert Systems	2	C
CIT 478	Artificial intelligence	2	E
CIT 484	Website Design & Programming	3	E
CIT 499	Project	6	C
DAM 461	Statistical Database System	3	C
	Total Credit Units – Compulsory	**14**	
	Total Credit Units – Elective	**5**	
	Total Credit Units	**19**	
	N/B: Students are expected to offer at least one elective		
	course per semester.		
	Maximum credit units allowed per semester is		
	25		

N/B: B.Sc Students must pass ALL compulsory courses.

1. **Course Content Specifications** For graduation with a B.Sc.(Hons) in Information Technology, a student must have passed 144 units of compulsory courses with a minimum of 17 credit units from elective courses for 8 semester structure; while for 6 semester structure, a student must pass 107 credit units of compulsory courses with 17 credit units of elective courses. Find below the course descriptions:

BIO101: GENERAL BIOLOGY I (2 UNITS)

Characteristics of living things; cell as the basic unit of living things, cell structure, organization, cellular organelles, tissues, organs and systems.

Classification of living things, general reproduction and concept of inter-relationships of organism. Heredity and evolution. Elements of ecology (introduction) and habitats.

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BIO102 GENERAL BIOLOGY II (2 UNITS)

Systematic studies of diversity of life including monera, protista, plants (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and angiosperms) and animals (Protozoa, Platyhelminthes, Annelids, Arthropods, Fishes, Amphibians, Reptiles, Birds and Mammals) based on similarities and differences in external morphology. Taxonomic divisions of plant and animal kingdoms. Ecological adaptations of these forms.

BIO191 GENERAL BIOLOGY PRACTICAL I (1 UNIT)

What practical work in biology involves. Laboratory organization. Handling common laboratory equipment. Microscopic handling and maintenance. Making microscopic measurements. Procuring animal materials for practicals. Killing, preserving and maintaining animal materials. Procuring plant materials. External features of plants (differences and similarities). Preparation of temporary slides. Preparation of stains and reagents. Techniques for microbial culture and grain staining. Setting up demonstration for physiological processes in plants. Setting up apparatus for demonstrating physiological processes in animals. Preparation required for dissection.

BIO192 GENERAL BIOLOGY LABORATORY II (1 UNIT)

Observation and description of the morphological and diagnostic features as well as the differences among the different phyla of the plant, animal, archebacteria, eubacteria, fungi and protista kingdoms. Identification of the taxonomic hierarchy of the members of the above groups. Study of the structure and functions of their parts and habitats specifications

CHM101: Introductory Inorganic Chemistry (2 units)

Hypothesis, theory and law with appropriate illustrations, Nature of matter – 3 states of matter, Atomic structure, electronic energy levels and orbital. Periodic classification of elements and its relationship to their electronic configurations, Chemical bonding, Survey of properties and trends in groups I, II, IV, VI and transition metal,

CHM102: introductory organic chemistry (2 units)

Simple reactions of hydrocarbons, alcohols, and acids. Petroleum chemistry, Oils and fats, hydrogenation of oils, polymer and biologically important molecule.

CHM103: Introductory Physical Chemistry (2 units)

Mole concepts and calculations based on it, methods of expressing concentrations, Chemical Kinetics and equilibrium, and related calculations, Important application of equilibrium – pH, solubility products and solubility of ionic solids, Thermo chemistry and simple calculations based on Hess's law, Electrochemistry and working of various cells, Brief mentions of corrosion; chemical thermodynamics; DG = DH – TDS

CHM191: Introductory practical chemistry I (1 unit)

Practical based of CHM 101 and CHM 103: Cations and anions – identification, Acid- base titrations, Redox reactions and determinations

CHM192: Introductory practical chemistry II (1 unit)

Practical based on general chemistry CHM 101 and introductory organic chemistry I CHM 102- Determination of melting and boiling points and reaction of functional groups.

GST101: USE OF ENGLISH AND COMMUNICATION SKILLS I (2 UNITS)

Listening enabling skills, listening and comprehending comprehension, note taking and information retrieval. Including data, figures, diagrams and charts. Listening for main idea, interpretation and critical evaluation. Effective reading. skimming and scanning. Reading and comprehension at various speed levels. Vocabulary development in various academic contexts. Reading diverse texts in narratives and expository. Reading and comprehension passages with tables, scientific texts. Reading for interpretation and critical evaluation.

GST102: USE OF ENGLISH AND COMMUNICATION SKILLS II (2 UNITS)

Writing paragraphs: Topic sentence and coherence. Development of paragraphs: illustration, Description, cause and effect including definitions. Formal letters; essential parts and stylistic forms, complaints and requests; jobs, ordering goods, letters to government and other organizations. Writing

reports; reporting event, experiments. Writing summaries: techniques of summarizing letters and sounds in English, vowels and consonants. Interviews, seminar presentation, public speech making, articles, concord and sentences including tenses. Gerund, participles, active, passive and the infinitive. Modal auxiliaries.

GST105 HISTORY AND PHILOSOPHY OF SCIENCE (2 UNITS)

Nature of science, scientific methods and theories; Law of nature,; History of science. Lost sciences of Africa, science, technology and inventions. Nature and scope of philosophy in science. Man, nature and his origin. Man, environment and resources. Great Nigerian Scientists.

GST104: USE OF LIBRARY

Identifying sources of Information, concept of library and library services, history of libraries. ICT use in the library, Copyright, Plagiarism and bibliographic Citation & referencing, functions and services of research libraries.

GST103: COMPUTER FUNDAMENTALS

Introduction to Computer, basic concepts, classifications of computers, historical views of computer. Threats to computer system, Computer Hardware and Software. Overview of computer programming languages. Detailed discussion of Computer Applications in various field.

GST107: THE STUDY GUIDE FOR THE DISTANCE LEARNER. (2 UNITS)

Getting started: How to use the book, why read about skills, getting yourself organised ; what is studying all about, reading and note taking; Introduction, reactions to reading, your reading strategy, memory, taking notes, conclusion. Other ways of studying: Introduction, learning in groups, talks and lectures, learning from TV and radio broadcasts, other study media. Working with numbers; Getting to know numbers, describing the world, describing with the tables, describing with diagrams and graphs; What is good writing? The Importance of writing, what does an essay look like, what is a good essay? Conclusion. How to write essays: Introduction, the craft of writing, the advantages of treating essay writing as a craft, making your essay flow, making a convincing case, the experience of writing. Preparing for examination.

MTH101 ELEMENTARY MATHEMATIC I: (3 Units)

(ALGEBRA AND TRIGONOMETRY)

Elementary set theory, subsets, union, intersection, complements, venn diagrams. Real numbers; integers, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem. Complex numbers; algebra of complex numbers; the Argand Diagram. Re Moivre’s theorem, nth roots of unity. Circular measure, trigonometric functions of

angles of any magnitude, addition and factor formalae.

MTH102 ELEMENTARY MATHEMATICS III: (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 integrals; Application to areas and volumes

MTH103 ELEMENTARY MATHEMATICS III: (3 Units) PRE-REQUISITE – MTH 101

(VECTORS, GEOMETRY AND DYNAMICS)

Geometric representation of vectors in 1-3 dimensions, components, direction cosines. Addition and Scalar multiplication of vectors and linear independence. The Scalar and vector products of two vectors. Differentiation and integration of vectors with respect to a scalar variable. Two-dimensional co-ordinate geometry. Straight lines, circles, parabola, ellipse, hyperbola. Tangents, normals.

STT102 INTRODUCTORY STATISTICS (2UNITS)

Measures of Central Tendency and dispersion, (grouped and ungrouped); mean: – arithmetic and geometric, harmonic, median, mode quartiles, deciles, modes, relative and absolute dispersion, sample space and events as sets. Finite probability space properties of probability. Statistical independenceand conditional probability. Tree diagram. Bayes theorem. Discrete and continuous random variables. Expectation, independent Bernoulli trials. Binomial Poisson and Normaldistributions. Normal approximation to binomial and Poisson distribution, Hyper geometric.

PHY101: Elementary Mechanics, Heat and Properties of Matter (3 UNITS)

Space and Time: Physical quantities: Units and dimensions of physical quantities; Kinematics: Uniform velocity motion, uniformly accelerated motion; Dynamics: Newton’s laws of motion; Impulse and Linear Momentum, Linear Collision, Newton’s universal law of gravitation; Work, energy and power; Conservation laws; Concept of mechanical equilibrium; Centre of mass and centre of gravity; Moment of a force; Rotational kinematics and dynamics: Torque; Moment of Inertia; angular momentum; Total mechanical energy. Simple harmonic motion

Heat and temperature, work and heat, Quantity of heat: heat capacities, latent heat; Thermal expansion of solids, liquids and gases; Gas laws, heat transfer; Laws of thermodynamics: Isothermal and Adiabatic changes, Carnot cycle; Application kinetic theory of gases; van der Waals gas.

Classification of matter into (solids, liquids and gases, forces between atoms and molecules,

molecular theory of matter, Elasticity, plasticity, Hook's Law, Young's Shear and bulk Moduli) Crystalline and non-crystalline materials, Hydrostatics: pressure, buoyancy, Archimedes' principle; Hydro-dynamics-streamlines, Bernouli and Continuity equations, turbulence, Reynold's number, Viscosity, laminar flow, Poiseuille's equation; Surface tension, adhesion, cohesion, capillary, drops and bubbles.

PHY102: ELECTRICITY, MAGNETISM AND MODERN PHYSICS (3 UNITS)

Electrostatics: Coulomb's law, Gauss's law, potential and capacitance, dielectrics, production and measurement of static electricity. Current: Ohm's law, resistance and resistivity, heating. Galvanometers, Voltmeters and Ammeters; D.C. circuits: sources of emf and currents, Kirchhoff's laws; Electrochemistry; The Earth's magnetic field; Magnetic fields and induction, Faraday's and Lenz's laws; Force on a current-carrying conductor. Biot-Savart law. Flemming's right and left-hand rules, motors and generators. A.C. Theory. Atomic structure; Production and properties of X-rays; Radioactivity; Photoelectric emission.

PHY191: Introductory Practical Physics I (1 unit)

Graphs, Measurement, Error Analysis, Determination of Acceleration due to Gravity by Means of Simple Pendulum, Determination of force constant of a spiral spring, Determination of effective mass of a spiral spring and the constant, Determination of surface tension of water, Determination of specific latent heat of fusion of ice, Determination of the co-efficient of limiting static friction between two surfaces, Determination of the co-efficient of static friction on two surfaces using an inclined plane, Determination of Relative Density of kerosene using the specific Gravity Bottle, Determination of the Relative Density of a Granular substance not soluble in water using the specific gravity bottle.

PHY192: Introductory Practical Physics II (1 unit)

Refraction through the glass block; Image formed by a concave mirror; Determination of the focal length of the convex mirror; Refraction through the triangular prism; Determination of the focal length of a converging lens and the refractive index of groundnut; Determination of resistance of resistors in series and in parallel in simple circuits; Determination of internal resistance of a dry cell using a potentiometer; To compare the E.M.F. of cells using potentiometer; Determine the unknown resistance of a resistor using Wheatstone Bridge; To determine the relationship between current through a Tungsten and a potential applied across it.

CIT 104: Introduction to Computer science (2 units)

What is Computer, Types of Computer, History of Digital Computer, Element of a Computer : Hardware and Software. How to work with a computer. Operating System Windows Files word processing, copying a text, saving, Changes to a document and Formatting, spelling checker and introduction to Printing a document. Spread sheet, Entering and correcting data. Using Formula, Numeric Formats Creating Charts. Types of Charts Power Points and presentation. Networking, Internet and E-mail. Reading and responding to an E-mail message.

CIT 102: Software Application Skills (2 units)

Overview of the discipline of Computer Science General structure of a computer system; Historical development of computer systems; Generations of computer system; Computer operations; Internal structure of a computer hardware; Microcomputer technology; Computer numbering system;

computer arithmetic; computer data representation schemes; Problem solving with computers Elements of programming languages. Computers in the Society internet and its facilities. Basic file processing concepts. Introduction to computer programming using VISUAL BASIC programming language; Algorithms, Data Structures and Logic; Laboratory exercises in VISUAL BASIC programming and the Internet.

CIT 211: Introduction to Operating System (3 units)

Definition of an operating system; Types of operating systems; and real time (single-user/multi-user), timesharing; Examples of operating systems; DOS, CP/M, UNIT/ZENITH,/LINUX, MS/9798/2000, etc. Components of an operating system; Supervisor, memory manager, I/O handlers, file system, etc. Operating system interface with the hardware; interrupts, i/o channel, multiplexer, registers, status words. Operating system interface with other systems software; linkers, translators, libraries, etc. storage organization and protection.

CIT 215: Introduction to Programming (3 units)

FORTRAN programming language; Comparison of various versions of the language. Programming exercises using FORTRAN with emphasis on scientific application problems. Elements of Pascal language. Exercises in Pascal Programme structures and programming concepts; Structured design principles; abstraction, modularity, stepwise refinement, structured design techniques teaching of a structured programming language, e.g. PASCAL/JAVA, C^{++}.

CIT 237: Programming and Algorithms (3 units)

The programme development process, programme design, coding, and testing principles of good programming styles; Programme verification techniques; Programme documentations and maintenance; Programme design tools, e.g. flowcharts, pseudocodes, etc. Illustration of the various concepts with practical programming problems of manageable complexity e.g. Knight's tour or 8-queens, life game problems, etc. Algorithms and data structures; Divide-and-conquer algorithms; Stacks, queues, trees. A treatment of popular sorting and searching algorithms; performance analysis of algorithms. Worst-, best-and average-case performance of the algorithms. Recursion, Hill-climbing techniques.

MTH 211: Introduction to Set theory and Abstract Algebra (3 units)

Set: Binary operations, mapping, equivalence relations integers: Fundamental theorem of arithmetic, congruence equations, Euler's function (n) Group Theory: Definition and examples of groups. Subgroups, coset decomposition, Lagrange's theorem. Cyclic groups. Homomorphism, isomorphism. Odd and even permutations, Cayley's theorem. Rings: Definition and examples of rings. Commutative rings. Integral domain. Order, well-ordering principles. Mathematical induction.

MTH213: NUMERICAL ANALYSIS I (3UNITS) PRE-REQUISITE – MTH 102

Interpolation: Lagrange's and Hermite interpolation formulae, divided differences and difference schemes. Interpolation formulas by use of divided differences. Approximation: Least-square polynomial approximation, Chebychev polynomials continued fraction and rational fraction orthogonal polynomials.

Numerical Integration: Newton's-cotes formulae, Gaussian Quadrature. Solution of Equations: Graffe's method (iterative method) Matrices and Related Topics: Definitions, Eigenvalue and Eigenvectors, Algebraic Eigenvalue problems-power method, Jacobi method.

Systems of linear Equations: Gauss elimination, Gauss-Jordan method. Jacobi iterative method, Gauss-field iterative method.

MTH 281: Mathematical Methods I (3 units)

Sequences and Series: Limits, continuity, Differentiability, implicit functions, sequences. Series, test for convergence sequences and series of functions. Calculus: partial differentiation, total derivatives, implicitly functions, change of variables. Taylor's theorem and maxima and minima functions, of two

variables. Langrangian multiplier. Numerical Methods: Introduction to iterative methods, Newton's method applied to finding roots. Trapezium and Sipsons rules of integration.

CIT 208: Information systems (2 units)

Introduction & Basic SQL Project Introduction. Advanced SQL. Conceptual Modelling and Schema Design. Database Programming, JDBC, Regular Expressions. Functional Dependencies E2: Functional Dependency & Relational Algebra. Relational Algebra. Introduction to XML. XML and XQuery. Web Services. Transactions. Recovery. Database Heterogeneity.

CIT 212: Systems Analysis & Design (3 units)

General systems concepts: Systems project team organisation; Overview of systems development process; Project identification and selection; system requirements analysis and feasibility study; fact finding techniques; Systems design; Analysis techniques and tools e.g. Jackson System Development (JSD) techniques etc. Data flow diagrams, HIPO charts. Business system design; procurement, site preparation, system installation, system testing, system conversions; system project, report writing, and presentation; system documentation; post installation evaluation; compilation of a real-life system analysis team project to provide experience in applying the principles and techniques presented above

CIT 236: Analog and Digital Electronics (3units)

Biploar Junction Transistors: Common Emitter biasin, load lines; Small signal Amplifiers: Transistor Hybrid parameters, Analysis of a single stage transistor amplifier small signal operation, Field Effect Transistors, Introduction to feedback, Operational Amplifiers, DC power supplies, Voltage regulators, Heat sinks, Boolean Algebra, Logic gates, Karnaugh Maps

CIT 292: Computer Laboratory I (2 units)

Basic logic Operations. Combinational logic, Karnaugh maps, Simple latch and clocked flip flop, J-k flip-flops, Binary addition, Synchronous counters, up and down counters.

MTH 212: Linear Algebra II (3 units)

Vector spaces. Linear independence. Basis, change of basis and dimension. Linear equations and matrices. Linear maps. The diagonal, permutation, triangular matrices. Elementary matrix. The inverse of a matrix. Rank and nullity. Determinants. Adjoint, cofactors, inverse matrix. Determinantial rank. Crammer's rule. Canonical forms, similar matrices, Eigen values and vectors, quadratic forms.

MTH 232: Elementary Differential Equation (3 units)

Introduction, equation of first order and first degree, separable equations, homogeneous equations, exact equations, linear equations, Bernoulli's and Riccati equations. Applications to mechanics and electricity. Orthogonal and oblique trajectories. Second order equations with constant coefficients.

MTH 282: Mathematical Methods II (3 units)

Vector Theory: Vector and scalar field functions. Grad, div, curl, directional derivatives. Orthogonal curvilinear coordinates.

Complex Numbers: The algebra and geometry of complex numbers; d'Moivre's theorem. Elementary transcendental functions. The n^{th} root of unity and of a general complex number.

CIT 303: Principles of Communication Technology (3 units)

Drives and Sensors: Functionality, calculation, and operational behavior of motors; Functionality and choice of sensors; Drive design and regulation; Decentralized drive systems. Communication and Networks: Functionality and integration of automation components (bus systems, automation devices, communication modules, process control systems); Networked automation technology; Service and monitoring systems, Human Machine Interface; Planning and the basic principles of project planning with *Profinet /* industrial Ethernet-based networks. Safety Engineering in Automation Technology: Project planning for an error-proof automation system; Error-proof communication and programming; Remote diagnostics, elimination of errors, and remote maintenance. Automated Systems: Integral development methodology in automation; Economic development (planning, budgeting); Application examples.

CIT 305: Networking and Communication Technology (3 units)

Introduction; Constructing data links, Deploying physical media; Practical network protocols; Capitalizing on Ethernet; Harnessing Wi-Fi for user mobility; Building internetworks using TCP/IP and routers; Utilizing telecommunication circuits; Implementing security best practices; Creating enterprise networks; Planning and selection. Protocols, technologies, standards, and applications of data communications and computer networks for both LANs and WANs. Foundation and background of Advanced WAN and LAN classes. Signal transmission analysis, modulation concepts, modems, multiplexers, digital technologies, transmission impairments, and various transmission media will be extensively discussed. Network protocols based on the OSI Reference Model, TCP/IP protocol suite, and IEEE 802 standards. Network technologies: ISDN, DSL, SONET, packet switching networks, LAN technologies, Internet and TCP/IP, and ATM

CIT 309: Computer Architecture (3 units)

Introduction, basic computer organization; Instruction formats, instruction sets and their design; ALU design: Adders, subtracters, logic operations; Boolean Algebra; Karnaugh Maps; Datapath design; Control design: Hardwired control, microprogrammed control; More on arithmetic: Multiplication, division, floating point arithmetic; RISC machines; Pipelining; Memory systems and error detection and error correction coding; Caches; Memory; I/O and Storage; Multiple Issue; Dynamic Scheduling; Data-Level Parallelism and Vectors; Shared-Memory; Multiprocessors; Multithreading

CIT 311: Computer Networks (3 units)

Networks, The Topologies, characteristics of the OSI Layer OSI Models and Communication between systems, Interaction between OSI Model layers, protocols types of Network : Local Area Network (LAN) Metropolitan Network (MAN): Wide Area Network (WAN). Medium Dataflow, physical connection, Transmission Media connecting devices repeaters, Hubs, Bridges Routers Gateway

CIT 341: Data Structures (3 units)

Basic data structure including lists and trees, constructs for specifying and manipulating data types. List structures, Binary, AVL and other trees, traversal algorithm, graphs, rings, recursive programming, storage managements; stacks, queues, language features affecting static and dynamic data structures, fixed and variable sized blocks, best-fit, first-fit, etc. garbage collection, fragmentation, buddy system, block compaction and relocation hash tables, programming exercises involving the implementation and use of data structures.

CIT 371: Introduction to Computer Graphics & Animations (3 units)

Mathematics of 3-Ds and projections; graphical data structures; characteristics, and types of display memories; graphics hardware including digital plotters and display devices; graphics, software;

CIT 381: File Processing and Management (3 units)

Review of basic, file processing concepts; the file management concepts; basic terminology and concepts; structure of file management systems; Data flow between systems; Data flow between systems; Data flow between internal memory and external storage; blocking and deblocking; files; searching and sorting techniques, merging; relevant i/o facilities for files processing of some high level programming languages such as FORTRAN, COBOL, PASCAL, etc; file organization methods; sequential indexed, direct/random, etc; Data validation; report generation, file management packages; file management security and integrity; assignment and completion of a data processing project Structures.

DAM 301: Data Mining and Data Warehousing (3 units)

Data Mining; Definition relationship to warehousing Classification of data mining approaches to data mining problems application of data mining , commercial tools of data mining, knowledge discovery, Architecture of Data warehousing Data marts, Data warehousing lifecycle, data modelling Building of data warehouse, OLAP, MOLAP, ROLAP Data warehouse and views. Future open issue for data warehouse.

CIT 322: Introduction to Internet Programming (3 units)

Introduction to current programming models in generating and supporting rich real-world web based applications. Internet architecture and organization. Internet services, electronic mail, data transfer, dial-up, connection protocols. Connection to Internet: modem connection, dial-up servers. Modern protocols for multimedia communication: Common Gateway Interface (CGI), multimedia messaging, protocols for multimedia communication – hypertext. HTML programming language: HTML tags and concepts such as tables, frames, forms and cascading style sheets; hypertext design. Web services and servers, examples and design of web pages, search engines and indexing. Elements of programming language: JavaScript, dynamic HTML pages. Development and the future communication using Internet. New technologies.

CIT 342: Formal Languages and Automata Theory (3 units)

Introduction to language structures; languages and their representations; Grammars; formal notations, types, Chomsky's language hierarchy; sentence generation and recognition; derivations; Ambiguity and syntax and finite state automata; context-free grammars; simplification of context-free grammars; Chomsky, Greibach Normal Forms Push-Down automata, LR(K), grammars, Recursive languages; semantics. Lab. exercises.

CIT 344: Introduction to Computer Design (3 units)

Introduction to numbers and codes. Combinational logic design and applications: adders, decoders, multiplexers, etc. Sequential logic design and applications: registers, flip-flops, etc., and general finite state machines. Memory devices: read-only memory (ROM), random access memory (RAM). Introduction to microprocessors: arithmetic logic unit (ALU), basic CPU architecture, addressing modes and program execution. Assembly language programming: programs for simple tasks; branching, loops, and subroutines.

CIT 389: Industrial Training (3 units)

Required 6 months of Industrial Training Students experiences will be documented and presented in a Seminar and submitted as a Tutor Marked Assignment. An example of a report is a report of a case study of a Cyber Cafe.

CIT 392: Computer Laboratory II (2 units)

Laboratory exercises using the programming language Laboratory exercises using a microcomputer operating system, e.g. MS-97/98/2000 Laboratory exercises using relevant programming languages such as C and C^{++}. Submission of a group project report of case study of a computer centre. Laboratory Exercises in COBOL, ADA, and SQL.

DAM 344: Semantic Data Modelling (2 units)

Concepts of Data Modelling: Overview of Data Modelling, Data Modelling concepts, Data models Semantic Data Modelling: Overview of Semantic Data Modelling, Semantic Data Models Semantic Data Modelling Concepts, Areas of Application of Semantic Data Modelling Application in Computer, Application in

DAM364 Management Information Systems (2 units)

Introduction to MIS, Types of MIS, Levels of Management, Overview of Information Technology, Technologies for Information System, Internets, Modes of Information Communication, Information Representation-, Information Storage Media, Information Security.

DAM382 Information Systems Management (3 units)

(Outstanding)

CIT 403: Emerging Technologies (3 units)

Learners are to carry out researches and write Term papers on the Current/Emerging technologies in Information and Communication Technology

CIT 411: Microcomputers and Microprocessors (2 units)

Review of basic concepts in digital electronic; Microprocessors; functions, operations and architecture; comparison of current microprocessors; multi-chip and single chip; i/o organization; assembler language; comparison of instruction sets; address modes, stack operation; subroutines. i/o data transfer; bus control; daisy chaining, handshaking etc; Interrupt structures; programmed transfer, DMA microcomputer systems; types of microprocessors; uses of microprocessors, microcomputer design for specific applications; microcomputer networking; interfacing microcomputer real-time control; laboratory exercises using an assembly language

CIT 415: Introduction to E-Commerce (3 units)

Introduction of basic concepts and definitions; Techniques and methodologies for for developing and managing Web-sites for e-Commerce. Topics include: Introducing pre-requisite skills, understanding Electronic business and electronic commerce, Techniques and methodology for site development,

Developing and enhancing a Product Catalogue, Managing a Shopping Cart, Processing orders, Completing the Purchasing process and Tracking Shoppers Information.

CIT 421: Information Theory and Computer Communications System (3 units)

Historical background of information theory models or computation systems, coding theory. Information and encoding, basic concepts of interactive computing, interactive terminals devices protocols, direct links, communication channels, telecommunications links, simplex, half duplex, duplex, multiplex, concentrators, computer networks operating system for online processing routing algorithms, response, time reliability and security.

CIT 427: Database Systems & Management (3 units)

Basic concept of data bases, history of DBMS types of database, specific problems of data independence, data reliability, integrity, etc, data, data management, data base generation, raw data, data definitions, data structure, storage structure data base logical and physical organization, interrogation, data model, network, hierarchical relational, security, policies, privacy quality and integrity protection mechanism.

CIT 445: Principles and Techniques of Compliers (3 units)

Recapitulation of formal grammars; source code and target code structure of typical compiler, comparative compiling techniques. Lexical analysis syntax analysis; simple precedence, operator precedence, LR(K) parsers; semantics, Runt time storage allocation code generation and code optimization. Compiler-compilers. Pragmatics of Compiler writing: Translator writing Error recovery and Optimization problems; Laboratory exercises leading to the productions of major parts of a compiler for an actual programming language.

CIT 461 Internet Architecture & Communications (3 units)

History of the Internet. Internet protocols (IP, FTP, HTTP, TCP). Network topologies. Renters. Bridges. Gate ways. Backbones. World wide web (www). TTP Sites and examples. Internet Browsers (Internet explorer, Netscape). Role of ISP’s Internet Connectivity Requirements. E-mail, E-Business. Website design and Hosting. Engines.

CIT 463: ***Introduction to Multimedia Technology*** **(3 units)**

Introduction: What is multimedia, Multimedia systems, Quality of service, Synchronization & orchestration, Standards, Convergence, Value chain. Hardware: Multimedia computers, Video and graphics, Audio, Telephone, video conference, and networks, CD and DVD, USB and FireWire, Processors, Video for Windows, DirectX, and ActiveMovie. Software: Browser based software architecture, Distributed software, Servers, Network, Terminals. Audio and Video: Digital audio; Psycho acoustics, Digital presentation of sound, Digital images, JPEG, Video signal, Camera sensors, Colors, Color television, Equipment, Compression systems, Basics of video compression, Methods, Algorithms. Interchange Formats: Application areas, Requirements, Track and object model, Real-time transfer, Different transfer formats, Comparison. Authoring Tools: Production process, Tools, Barriers, Development areas. Communications: QoS, ATM, QoS implementations, Integrated Services, Differentiated Services. Multicast: Group control, Routing, Real-time transfer and control protocols, Resource reservation, Session control, MBone. Video Conference: Standards, Products, Internet telephony, CTI (Computer Telephony Integration). Access Networks: Cable television, Digital subscriber lines, UMTS, Digital television.

CIT 465: Network Administration (2 units)

Introduction to Network Administration: scope, goals, philosophy & standards. IT System Components and Network Structures, technology and protocols. System Administration: host computer and user management. Network Administration methods and Standards. Managing devices using SNMP and RMON. Management issues: planning, implementation, fault diagnosis and recovery. Network Simulation as a management tool. Network Documentation. Network Security and Administration.

CIT 469: Protocols Design and Programming (2 units)

Introduction: Stages in Protocols design: Problem definition, requirements analysis, protocol design and implementation in software. Protocol design tools. Overhead: bandwidth, CPU, etc. Protocol life cycle. Preparing for future versions of the protocol: version numbers, reserved bit fields, forwards and backwards compatibility. Parameters setting. Desirable protocol features: auto-configuration, robustness (simple, self-stabilization and Byzantine robustness. Documentation and standardization. Planning an upgrade path for future versions. Mobility. Ubiquitous computing. Comprehensive security: Nano-computing, bio-computing.

CIT 422: Techniques in Data Analysis (3 units)

(Outstanding)

CIT 425: Operations Research (3 units)

Simple theories of queues, stochastic processes and random numbers, definition and uses of simulation; discrete simulation models, design of simulation experiments; simulation langs, detailed study of a chosen simulation language; applications; Lab. exercises. The nature of operation research; allocation problems; inventory problems; Replacement; maintenance and reliability problems. Dynamic programming; sequencing and co-ordination.

CIT 474: Introduction to Expert Systems (2 units)

Study of different classes of expert systems, e.g. Rule Based: MYCIN or PROSPECTOR, Blackboard; HEARSAY or CRYSLIS, Expert System shells e.g. Rule Based: e.g. P-MYCIN, EXPERT. S.I. Frame Based e.g. KEE, KL-ONE Merit and Demerits of natural language interface for expert systems. Extensive independent study of recent development in the field and the submission of a group proposal for the application of Expert System in different areas.

CIT 478: Artificial Intelligence (2 units)

Basic AI issues attention, Search, Control, Game trees, knowledge representation, Application of AI techniques in natural language, scene analysis, expert systems, KBCS robot planning. Lab. exercises in AI lang. e.g., LISP/Prolog.

CIT 484: Website Design & Programming (2 units)

What is HTML; Basic Tags of HTML; HTML Tag TITLE Tag Body Tag Formatting of Text, Headers, Formatting Tags, Pre-Tag FONT TAG Special Characters Working with Images META Tag; Links: Anchor Tag, Lists; unordered lists ordered lists, definition lists, tables : TABLE, TR and TD Tags Cell spacing and cell padding colspan and Rowspan Frames: Frameset frame Tag, NOFRAMES Tag Forms: FORM and INPUT Tag,; Text Box Radio Button, checkbox. Select tag and pull down. Lists hidden submit and Reset. Some special Tags: COLGROUP, THREAD, TBODY, TFOOT, blank self,

parent top, IFRAME LABEL TEXTAREA. INTRODUCTION TO Java Script: Java script variables and data types. Statement and operators, control structures object based programming message box in JavaScript, Javascript with HTML forms

CIT 499: Project (4 units)

Individual or Group projects of approved topics related to the current research interests in the department.

DAM 461: Statistical Database System (2 units)

Fundamentals of Database Systems: Databases and Database Users, Database System Concepts and Architecture, Data Modelling Using the Entity-Relationship Model.The Statistical database system, Statistical Database Concepts, Statistical Data Analysis, Mining and Decision Tree Computer Security and Statistical Databases Application of Statistical Database System SPEA SMART Airport Statistical Data Management System (SMART STAT)

CIT 499: Projects

Individual or Group projects of approved topics related to the current research interests in the department.