



CLARETIAN UNIVERSITY OF NIGERIA

Curriculum for Year One, Computer Science.

YEAR I: FIRST SEMESTER							
SN	CODE	TITLE	T	L	P	CU	STATUS
1	CSC101	Computer Science and Applications	1	1	2	4	C
2	CSC103	Introduction to Programming using Python	1	1	2	4	C
3	MTH101	Algebra I	1	2	0	3	C
4	CHM101	General Chemistry	1	1	0	2	R
5	PHY101	General Physics	1	1	0	2	R
6	GST101	Use of English I	1	2	0	2	C
7	GST121	Use of Library, Study Skills and ICT	0	1	1	2	R
			5	9	5	19	

YEAR I: SECOND SEMESTER							
SN	CODE	TITLE	T	L	P	CU	STATUS
1	CSC102	Computer Programming I (Java)	1	1	2	4	C
2	CSC104	Advanced programming using Python	1	1	2	4	C
3	CSC106	Introduction to Web Development (HTML, JavaScript, DOM, JQuery)	1	1	2	4	C
4	MTH102	Algebra II	1	2	0	3	C
5	CHM102	General Practical Chemistry	0	0	1	1	R
6	PHY102	General Practical Physics	0	0	1	1	R
7	GST112	Logic, Philosophy and Human Existence	0	2	0	2	E
			4	7	8	19	

Course Description for the Core Courses are as follows:

CSC 101: Computer Science and Applications

(Word processors, Presentation, Spreadsheet, Internet and Social Media)

General Introduction to Computer Science and Computers: Overview of the computer science discipline. Evolution of computers and classification of computers. A general overview of computer hardware and software systems. **Everyday computing Applications:** Word processing, Spreadsheet, Statistical packages, graphics packages and any other applications. Web browsers and Internet, search engines, social media. Practicum and hands-on exercises.

CSC 103: Introduction to Programming using Python

Tools and Resources: Overview of the resources required to successfully develop python programs is required. **Basic building blocks of python:** interactive interpreter, variables and types, numbers and booleans, strings and lists, string formatting, control flow, loops and functions, console I/O, and file I/O, running python as a script, modules, imports and virtual environments. **Python standard tools for data manipulation (data structures):** A review of Lists, dictionaries, and sets with emphasis on their common operators, looping techniques (enumerate, zip), and comprehensions. **Object-Oriented Python:** Explore namespace and scope, python data model, class, objects and methods associated with objects, inheritance and python magic method. **Functions:** Examine the function execution model with respect to return values, scope, and semantics for parameter passing; Keyword arguments, default arguments. **Python for Web (an application):** Querying and parsing websites, discuss the development websites that are powered by python, Interacting with APIs, building and deploying a Flask or Django application. **Functional Programming:** Overview of the functional programming idea and its relevance, concepts of higher-order functions: map and filter, and anonymous lambda function, iterators, generator expressions, decorators as applications of functional programming for solving common programming problems. **Extras:** Python standard library and third-party packages. **Practicum:** The course is intensively demo-and-hands-on-driven. **Final Project:** The students are expected to deliver a final project as part of the assessment for the course.

MTH 101: Algebra I

Linear equations and inequalities: Linear functions - applications involving linear functions, linear inequalities in one variable, compound and absolute value equations and inequalities, linear equations in two variables, slope, point slope form, slope intercept form, parallel and perpendicular lines, graph linear equations and inequalities in two variables, solving systems of linear equations in two variables, applications involving linear equations and inequalities in two variables. **Polynomials:** Addition and subtraction of polynomials, multiplication and division of polynomials, integer exponents and scientific notation. **Factoring polynomials:** Exponent rules, common factors, factoring by grouping, factoring the difference of squares, factoring the sum or difference of cubes, special factoring – trinomial squares, solving quadratic equations by factoring.

CHM101 General Chemistry

Chemical reaction, equations and stoichiometry, Atomic structure and the periodic classification of elements. Electronic theory of atoms, Radioactivity, Ionic and covalent bonds, Solids and their structure. Dipole interactions and its effect on physical properties, Redox reaction, Equilibrium, Elementary electrochemistry, Introduction to Kinetic properties of gasses, Basic chemical Kinetics and Chemical thermodynamics, Principles of Metal Extraction.

PHY101 General Physics

Mechanics: Space and Time, Units and dimensions; Vectors kinematics, Newton's laws; Galilean invariance; Statics and dynamics of particles; Universal Gravitation; Work and potential energy, conservation of energy and momentum; Rigid bodies, Elasticity; Hooke's law, Young's, Shear and bulk moduli. Fluid mechanics; Hydrostatics, pressure, buoyance, Archimedes' principles, surface tension, adhesion, cohesion, capillarity, drops and bubbles. Thermal Physics: thermal properties, including elementary thermodynamics and kinetic theory. The laboratory course emphasized qualitative measurements, the treatment of error measurements and graphical analysis. A variety of experimental techniques will be employed.

GST101 Use of English I

Effective communication and writing in English language skills, essay writing skills (organization and logical presentation of ideas, grammar and style), vocabulary development techniques, reading and comprehension techniques, listening and note-taking techniques – outlining and summarizing, dealing with examination questions.

GST121 Use of Library, Study Skills and ICT

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). Library orientation, study aids through dictionary practice,

CSC102: Computer Programming I (Java)

General Introduction to tools and Basic Building blocks: Java/JVM, Java application development tools, Compilation and execution of Java programs, Java program structure, variables and types, numbers and booleans, strings and string processing, program control structures, loops, and memory concepts. **Methods:** Program modules in Java, various types of Methods and how they are declared and used, declaring Methods with multiple parameters, Method scoping, Method overloading, Method call stack and activation records, argument promotion and casting. **Arrays and ArrayLists:** Declaring, creating and using arrays, enhanced *for* statement with Arrays, searching Arrays, passing Arrays to Methods, Multidimensional Arrays, Variable-length arguments lists, Using command line arguments, Class Arrays, Collections and Class ArrayList. **Classes and Objects:** Classes, Objects, Methods and Instance variables, Declaring Classes with a Method and instantiating an Object of a class, Declaring Methods with parameters, Instance variables, *set* methods, *get* methods, primitive vs reference types, controlling access to Methods, using the *this* reference, Constructors - initializing object with constructors, Overloaded constructors, Default, and No-Argument constructors. Collection and Generics, Composition, Enumerations, Package access and Garbage collection. **Object-Oriented Programming:** Inheritance – the concepts of superclass and subclasses, protected members, relationship between superclasses and subclasses, constructors in subclasses, the *Object* Class. Polymorphism – Polymorphism examples, demonstrating polymorphic behaviours, abstract Classes and Methods, final Methods and Classes, Overriding Methods, Interfaces, Java Class Library. **Files, Streams and Object Serialization:** Data hierarchy, Files and Streams, Class *File* Sequential access text files, Object serialization – serializing and de-serializing data from a sequential-access file using object serialization, *java.io* Class – interfaces and Classes for Byte-based and Character-based input and output. **Extras:** GUI Components, Exception handling, Graphics, Networking, Multithreading, Java Applets, JDBC, Java Web services. **Final Project:** The students are expected to deliver a final project as part of the assessment for the course. **Practicum:** The course is intensively demo-and-hands-on-driven.

CSC104: Introduction to Problem-Solving (applying Python)

A study of the concepts and properties of algorithms, algorithm development, development of flow charts, pseudocodes development, program design, coding, debugging, implementation strategies, and documenting programs using techniques of a good programming language style, including procedural and data abstractions. Discussion of problem solving methods, review brainstorming and brainstorming techniques, discuss the principles of the six thinking hats in the context of creative thinking. **Practicum:** Create and solve critical thinking problems to be solved using the methods treated in the course and implement the solutions using Python.

CSC106: Introduction to Web Development (HTML, JavaScript, DOM, JQuery)

This course will mostly concentrate on the front end web development skills and a little of back end techniques. The topics to be covered will include HTML, CSS, JavaScript, Node.js, jQuery, DOM and Mysql or any other such web scripting tools that may be in popular use at any given time. The course could be delivered with emphasis on layout and styling (HTML, CSS, XML, DOM), Client Side Interaction (JavaScript, jQuery) and Server Side Interaction (Node.js and MySQL).

MTH 102: Algebra II

Polynomials/Polynomial Functions, Quadratic Relations/Conic Sections, Powers, Roots, and Radicals, Trigonometric Ratios/Functions, Exponential and logarithmic Functions, Trig. Graphs and Equations, Rational Equations and Functions, Probability & Statistics.

CHM102 General Practical Chemistry

Laboratory experiments designed to reflect the topics taught in CHM101 such as qualitative and quantitative chemical analysis, acid-base titrations. Gravimetric analysis. Calculation, data analysis and presentation. Functional group analysis.

PHY102 General Practical Physics

This introductory course emphasizes quantitative measurements, the treatment of measurement errors, and graphical analysis. A variety of experimental techniques will be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, etc., covered in PHY101. Emphasis should however be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

GST112 Logic, Philosophy & Human Existence

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 of arguments, Validity and soundness; Techniques for evaluating arguments, Distinction between inductive and 15 deductive inferences.