1st YEAR EVEN SEMESTER

CSE 1200 **Contact hours/week: 3/2**
Analytical Programming **Credits: 0.75**
Prerequisite: CSE 1101
Student will Solve at least 30 (Thirty) Problems using C, C++ or Java. Among them at Least three Problems should be Submitted from Geometry, Mathematics, String Processing, Tree, Graph and Sorting Techniques.

CSE 1201 **Contact hours/week: 3**
Data Structure **Credits: 3.00**
Prerequisite: CSE 1101
Introduction: Concepts and Examples of Elementary Data Objects, Necessity of Structured Data, Types of Data Structure, Ideas on Linear and Nonlinear Data Structure.
Linear Array: Linear Array & its Representation in Memory, Traversing LA, Insertion & Deletion in LA, Bubble Sort, Linear Search & Binary Search, Multidimensional Array & its
Representation in Memory, Algebra of Matrices, Sparse Matrices.
Stack: Stack Representation & Applications; PUSH and POP Operation on Stack. Polish
Notation, Reverse Polish Notation; Evaluation of a Postfix Expression; Transforming Infix Expression into Postfix Expression.
Queue: Its Representation, Insertion & Deletion in Queue, Priority Queues, Recursion [Factorial Function, Fibonacci Sequence, Ackermann Function, Towers of Hanoi].
Linked List: Linked List & its Representation in Memory, Traversing, Searching, Insertion
& Deletion Operation on Linked List, Circular List, Header Linked Lists, Two Way Lists.
Complexity: Algorithm and Flow Chart, Complexity of Algorithms, Rate of Growth, Big O
Notation, Complexity of Linear Search, Binary Search & Bubble Sort Algorithm.
Sorting: Insertion Sort, Selection Sort, Quick Sort, Merge Sort, Searching & Data Modification, Hash Function, Collision Resolution, Chaining.
Tree: Tree Terminology, Representation of Binary Trees in Memory, Traversing Binary Tree, Binary Search Tree, Insertion & Deletion on Binary Search Tree, Insertion & Deletion on Heap, Heap Sort, B Trees, General Tree.

CSE 1202 **Contact hours/week: 3**
Sessional based on CSE 1201 **Credits: 1.50**
Prerequisite: None
Sessional based on the theory course CSE 1201

CSE 1203 **Contact hours/week: 3**
Object Oriented Programming **Credits: 3.00**
Prerequisite: CSE 1101

Fundamentals of OOP: Introduction to Object Oriented Programming, Principles of Object Oriented Design, Encapsulation and Information-hiding, Inheritance, Polymorphism, Data Binding, Static and Dynamic Binding.
Classes and Objects: Structure of Class, Access Modifiers, Nested Classes, Abstract Classes, Arrays of Objects, Pointer to Objects, Friend function, Data abstraction.
Constructors and Destructors: Default Constructor, Copy Constructor, Dynamic Constructor, Constructor Function for Derived Class and their Order of Execution, Destructor.
Inheritance: Single Inheritance vs. Multiple Inheritance, Mode of Inheritance, Virtual Inheritance.
Polymorphism: Operator and Function Overloading, Run-Time and Compile Time Polymorphism, Virtual Function, Errors and Exception Handling.
Advanced Topics: Persistent Objects, Objects and Portable Data, UML Basics, Design Patterns, Multithreading.
Reference Programming Language(s): C++ and Java.

CSE 1204 **Contact hours/week: 3**
Sessional based on CSE 1203 **Credits: 1.50**
Prerequisite: None

Sessional based on the theory course CSE 1203

Math 1213 **Contact hours/week: 3**
Co-ordinate Geometry and Ordinary Differential Equation **Credits: 3.00**
Prerequisite: None

Co-ordinate Geometry: Co-ordinate Geometry of Two Dimensions: Change of Axes, Transformation of Co-Ordinates, Simplification of Equations of Curves.
Co-ordinate Geometry of Three Dimensions: System of Co-Ordinates, Distance between two Points, Section Formula, Direction Cosines and Projection, Planes and Straight Lines.
Ordinary Differential Equation: Degree and Order of Ordinary Differential Equations. Formation of Differential Equations. Solutions of First Order Differential Equations by Various Methods, Solutions of General Linear Differential Equations of Second and Higher Orders with Constant Coefficients, Solution of Homogeneous Linear Differential Equations. Solution of Higher Order Differential Equations when the Dependent of Independent Variables are Absent. Solution of Differential Equation with Constant Coefficients by Operator Method. Differential Equations with Variable Coefficients.

Hum 1213 **Contact hours/week: 3**
Economics, Government and Sociology **Credits: 3.00**
Prerequisite: None

Economics: Nature of the Economics Theory Applicability of Economic Theory to the Problems of Developing Countries, Some Basic Concepts Supply, Demand and their Elasticity. Economics and Technology. Producer's Equilibrium-Isoquant. Production - Factors of Production, Production Possibility Curve-Equilibrium of a Firm, Fixed Cost and
Variable Cost, Laws of Returns ,Internal and External Economics and Dis-Economics, Input Output Analysis. Economic Growth and Economic Development and Planning Basic
Concept-Saving, Investment, GNP, NNP, Per-Capita Income, Growth Rate, Fiscal Policy,
Monetary Policy and Trade Policy and their Relative Applicability in Bangladesh, Planning-
Five Year Plans of Bangladesh, Development Problems Related to Agriculture. Industry and Population of Bangladesh.

Government: Basic Concepts of Government and Politics. Functions, Organs and Forms
of Modern State and Government, Socialism. Capitalism, UNO, Government and Politics
of Bangladesh, Some Major Administrative Systems of Developed Counties. Local Self - Government. Central Government, Public Opinion.

Sociology: Scope, Culture and Civilization Relationship, Social Structure of Bangladesh.
Industrial Revolution, Urbanization and Industrialization, Urban Ecology, Cyber Crime and
Delinquency, Sociology of Education. Relationship-Sociology and Cyber Crime. Causes and Remedies of Cyber Crime.

Phy 1213 **Contact hours/week: 3**
Physics **Credits: 3.00**
Prerequisite: None

Structure of Matter: Structure of Matter. Different Types of Bonds in Solids: Metallic, Van
Dar Waals', Covalent and Ionic Bond, Packing in Solids: Inter Atomic Distances and Forces of Equilibrium, X-Ray Diffraction, Bragg's Law. Distinction Insulator, Semiconductor and Conductor.

Atomic Physics: Atom Models: Thomson Atom Model, Rutherford Atom Model, Rutherford Scattering Formula, Electron Orbits, Bohr Atom Model, Energy Levels and Spectra, Particle Properties of Waves: Photoelectric Effect, Einstein's Photoelectric Equation, Laws of Photoelectric Emission, Photovoltaic Cells, Compton Effect. Wave Properties of Particle: De Broglie Waves, Group Velocity, Phase Velocity.

Waves and Oscillations: Oscillations: Simple Harmonic Motion, Composition of Simple

Harmonic Motions and Lissajous' Figures, Damped and Forced Oscillations. Resonance.
Waves: Travelling and Standing Waves, Energy Calculation of Traveling and Standing Waves, Intensity of Waves. Beats, Doppler Effect.
Theories of Light: Wave Theory: Huygens Wave Theory. Huygen's Principle and Construction, Superposition of Light Waves. Electromagnetic Theory. Particle Theory: Newton's Corpuscular Theory, Quantum Theory of Light.
Interference: Introduction, Conditions of Interference, Young's Double Slit Experiment, Fresnel's Biprism. Thin Film Interference, Interference Due to Multiple Reflection, Newton's Ring.
Diffraction: Fresnel's and Fraunhoper Diffraction, Diffraction by Single and Double Slit, Diffraction Gratings.
Polarization: Introduction, Methods of Producing Polarized Light, Polarization by Reflection and Refraction, Polarization by Double Refraction, Constrauvtion of Nicol Prism, Production and Analysis of Polarized Light, Optical Activity, Optics of Crystals, Polarimeters.

Phy 1214 **Contact hours/week: 3**
Sessional based on Phy 1213 **Credits: 1.50**
Prerequisite: None
Sessional based on the theory of course Phy 1213.