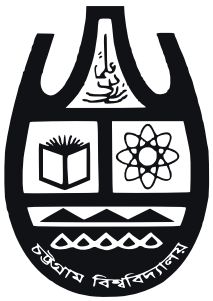

Department of Computer Science and Engineering

Syllabus for the Degree of B.Sc. Engineering

Session: 2020-2021 and 2021-2022

3rd Semester

Course and Credit-Hour Distribution

Course Code	Course Title	*Credits*		Hours/Week	
		Theory	*Laboratory*	*Theory*	*Laboratory*
CSE 311	Object Oriented Programming	3		3	
CSE 312	Object Oriented Programming Lab		2		4
EEE 321	Digital Logic Design	3		3	
EEE 322	Digital Logic Design Lab		1		2
MAT 331	Complex Variables, Linear Algebra, Laplace and Fourier Analysis	4		4	
STA 351	Probability and Statistical Analysis	3		3	
ECO 381	Economics	3		3	
Total for Semester		16	3	16	6
		19		22	
Cumulative Total		49	9	49	18
		58		67	

CSE 311 Object Oriented Programming

75 Marks, 3 Credits, 3 Hours/Week

Introduction to Java: History of Java, Java Class Libraries, Introduction to Java Programming, A Simple Program.

Developing Java Application: Introduction, Algorithms, Pseudo code, Control Structure, The If /Else Selection Structure, The While Repetition Structure, Assignment Operators, Increment and Decrement Operators, Primitive Data Types, Common Escape Sequence, Logical Operator

Control Structure: Introduction, The For Structure, The Switch Structure, The Do/While Structure, The Break and Continue Structure.

Methods: Introduction, Program Module in Java, Math Class Methods, Method Definitions, Java API Packages, Automatic Variables, Recursion, Method Overloading, Method of the Applet Class.

Arrays: Introduction, Arrays, Declaring and Allocating Arrays, Passing Arrays to Methods, Sorting Arrays, Searching Arrays, Multiple-Subscripted Arrays

Object-Based Programming: Introduction, Implementing a Time Abstract DataType with a Class, Class Scope, Controlling Access to Members, Utility Methods, Constructors, Using Overload Constructor, Using Set and Get Method, Software Reusability, Friendly Members, Finalizers, Static Class Members, Data Abstraction and Information Hiding

Object-Oriented Programming: Introduction, Superclasses and Subclasses, Protected Members, Using Constructor and Finalizers in Subclasses, Composition vs. Inheritance, Introduction to polymorphism, Dynamic method building, Final Methods and Classes, Abstract Superclasses and Concrete Classes.

String and Characters, Graphics, Exception Handling, Files and Stream, Java API, Utility Classes, 2D Graphics, GUI, Swing, Events.

Text Book:

1. Java 2: The complete reference: Patrick Naughton & H. Schildt.

Reference Book:

1. Java How to program: Deitel & Deitel.
2. Sun Java Tutorial: Oracle Corporation

CSE 312 Object Oriented Programming Lab

50 Marks, 2 Credits, 4 Hours/Week

(Recommended but not limited to the following topics)

1. Editing, compiling and executing a Java Program using jdk
2. Generate the Fibonacci series and keep the Fibonacci terms in an array and print them
3. Find out the prime numbers in a Fibonacci series
4. Create a simple Student class, Convert Celsius to Fahrenheit
5. Override a method in the Student class
6. Overloading a method in the Student class
7. Exception Handling of Exp. 04
8. Creating and executing simple Applets
9. Input from and output to a file
10. Multi Threaded programming
11. Implementing Simple Client-Server (Connection oriented and Connectionless)

EEE 321 Digital Logic

75 Marks, 3 Credits, 3 Hours/Week

Codes, Logic Gates and Combinational Circuits. Standard/Canonical forms. Algebraic simplification, the Karnaugh map method, Quine-McCluskey method.

Arithmetic Circuits: Adder circuit. Carry propagation, carry look-ahead adder. IC parallel adder. The 2's complement addition and subtraction system. The BCD adder. Binary multiplier

MSI Logic Circuits: Decoders, BCD-to-decimal decoders, BCD-to-7-segment decoder/driver. Encoders. Multiplexers and multiplexer applications. De-multiplexers.

Sequential Circuits: Flip-flops: SR, JK, D and T flip-flops. The D latch. Master-slave FF. Flip-Flop applications. Edge triggering; FF synchronization.

Counters and Registers: Asynchronous counter, Ripple counter, mod counters, Propagation delay, Synchronous up/down counters. Cascading counters. Registers; Counter and Register applications.

Finite State Machines: Finite State machine models. Mealy machine, Moore machines. Machine minimization.

Text Book:

1. Digital logic and computer design: Morris Mano.

Reference Book:

1. Switching and Finite automata theory: Zvi Kohavi.
2. Digital systems: Ronald J. Tocci.
3. Digital Fundamentals: Floyd.

EEE 322 Digital Logic Design Lab

25 Marks, 1 Credits, 2 Hours/Week

(Recommended but not limited to the following topics)

1. Implementation of Basic Logic Gates : AND, OR, NOT
2. Implementation of Logic Gates : NOR, NAND, X-OR, X-NOR
3. Verification of De Morgans theorem and Logic circuits
4. Implement Half Adder and Full Adder Circuit
5. Implement of BCD adder circuits,
6. Test and Verification of S R , J K, T, D Flip-Flop circuit
7. Implementation of Asynchronous Up and Down counter
8. Implementation of Synchronous Up and Down counter
9. Design and Implementation of BCD counter.
10. Test of IC of Encoder and Decoder
11. Test of IC of Multiplexer and De-multiplexer
12. Operation of seven segment display and Design of Digital Lock
13. Conversion of A/D and D/A

MAT 331 Complex Variables, Linear Algebra, Laplace and Fourier Analysis

100 Marks, 4 Credits, 4 Hours/Week

Complex Variable: Complex Number and Their Properties, Functions of a Complex Variable, Limit and Continuity, Cauchy-Riemann Equations, Cauchy's Theorems, Singularity and Poles, Residues, Simple Contour Integration.

Linear Algebra: systems of linear equations, echelon forms, vector equations, linear independence; matrix operations, matrix factorizations, characteristics of invertible matrices; properties of determinants, Cramers rule.

Laplace: Definition, Laplace Transformation of Different Functions, Sufficient Conditions For Existence of Laplace Transformations, Inverse Laplace Transformations, Laplace Transformations of Derivatives, Some Special Theorems on Laplace Transformations, Partial Fraction, Convolution, Solution of Ordinary Differential Equations by Laplace Transformation, Application to Differential Equations.

Fourier: Fourier Series, Convergence of Fourier Series, Fourier Analysis, Fourier Transformations and Fourier Integrals.

Text Books:

1. Theory of Mathematics: Frank Ayres.
2. Mathematical Physics: Rajput.

Reference Books:

1. Complex Variable: M.R. Spiegel.
2. Functions of a Complex Variable: B.S. Tyagi.
3. An Introduction to the Theory of Function of a Complex Variable: E.T. Capson.
4. Theory of Function of Complex Variable: Shanti Narayan.
5. Complex Variable: V. Churchill.
6. Higher Engineering Mathematics: B.S. Grewall.
7. Mathematical Physics: Rajput.
8. Mathematical Physics: B.D. Gupta.
9. Laplace Transformation: M.R. Spiegel.

10. Linear Algebra and Its Applications: .C. Lay, S.R. Lay, and J.J. McDonald; Pearson Education

11. Introduction to applied linear algebra: vectors, matrices, and least squares: Stephen Boyd and

12. Vandenberghe; First Edition. Cambridge University Press

13. Introduction to Orthogonal Transforms With Applications in Data Processing and Analysis: Ruye

14. Cambridge University Press

15. Fourier Series and Integral Transforms: A. Pinkus and S. Zafrany; Cambridge University Press

STA 351 Probability and Statistical Analysis

75 Marks, 3 Credits, 3 Hours/Week

Elementary Probability Theory: Terminologies and Classical Definition, Additive and Multiplicative Laws of Probability, Conditional Probability, Bayes Theorem, Joint and Marginal Probabilities. Random Variables, Discrete & Continuous Random Variable Expectation and Variance, Moments and Moment Generating Function. Determination of Confidence interval.

Probability Distributions: Binomial, Geometric, Exponential, Poisson & Normal Distribu tions, Theorems and Properties of The Probability Distribution and Their Applications. Random Variables and Stochastic Processes, Discrete Time and Continuous Time Markov Chain, Birth-Death Process, Queuing Models M/M/1, M/M/1/K, M/G/1, Open and Closed Queuing Network. Application of Queuing Models and Network.

Text Book: 1. Introduction to Probability Models: Sheldon Ross.

Reference Books:

1. A first course in probability: Sheldon Ross.
2. Probability, random Variables and Stochastic Process: Papoulis.
3. Probability Models for Computer Science: Sheldon Ross.

ECO 381 Economics

75 Marks, 3 Credits, 3 Hours/Week

Basic Concepts of Economics: Definition and Subject Matter of Economics; Microeconomics Vs Macroeconomics; Law of Economics; Central Economic Problems of Every Society; Different Economic Systems; Economics and Engineering, Concept of Microeconomics and Macroeconomics.

Theory of Demand, Supply and Consumer Behavior: Law of Demand; Demand Schedule and Demand Curve; Supply Law, Supply Schedule and Supply Curve; Shift in Demand and Supply; Equilibrium in The Market; Elasticity of Demand and Supply; Marshallian Utility Analysis; total and Marginal Utility; Law of Diminishing Marginal Utility; Law of Equi Marginal Utility.

Theory of Production and Costs: Meaning of Production; Factors of Production; Production Possibility Frontier; Law of Variable Proportion; Returns to Scale; Isoquants; Concepts of total, Average and Marginal Costs, Fixed and Variable Costs; Isocost Curve; Least Cost Combinations of Factors.

Linear Programming and input-Output Analysis: Meaning of Linear Programming; Its Components; Duality of A Problem in Linear Programming; Graphical, Feasible and Optimal Solutions; The Simplex Method; Meaning of input-Output Analysis; input-Output Analysis Model; Balance Equation; Coefficient Matrix; Determination of Final Demand Vector.

Development Planning in Bangladesh: Need For Planning in Bangladesh; Various Five Year Plans in Bangladesh; Development Strategies in The Five Year Plans of Bangladesh.

Text Book: 1. Economics: Byrons & Stone.

Reference Books:

1. Economics: Semuelson & Nordhous.
2. Modern Economic Theory: K. K.Dewett.
3. Advanced Economic Theory: H. L Ahuja.
4. Government of Bangladesh Various Five Year Plans.