

Department of Information Technology
Central University of Kashmir
Nowgam Campus III, Srinagar

Syllabus for B. Tech. CSE 4th Semester

S. No	Course Code	Course Title	Credits	Evaluation		
				CIA	ESE	Total
1.	BT 401	Mathematics IV (Eng. Math)	4	40	60	100
2.	BTCS 402	Object Oriented Programming Structures (C++)	4	40	60	100
3.	BTCS 403	Discrete Structures	4	40	60	100
4.	BTCS 404	Logic Design	4	40	60	100
5.	BTCS 405	OOPS Laboratory	2	40	60	100
6.	BTCS 406	Logic Design Lab	2	40	60	100
7.	BT 407	Economics for Engineers	2	40	60	100
		Total	22			

BT 401: Mathematics IV (Eng. Math)

Unit 1

Probability and Statistics: Measures of Central Tendency: Mean, Median, Mode, Dispersion: Range, Standard Deviation; Probability: Definition, Motivation, Probability Models, Probability Rules, Sample Space having equally likely outcomes, Conditional Probability; Baye's Theorem; Independent Events.

Unit 2

Random Variable; Discrete Random Variable, Distribution Function, Probability Mass Function, Poisson and Binomial Distributions, Continues Random Variables, Probability Density Function , Uniform and Normal Distributions.

Unit 3

Correlation ,coefficient of correlation, Linear Regression, regression coefficient, Method of Least Squares, Introduction to Sampling and Sampling Distribution, Standard Error , sampling distribution of the Mean (known) Sampling Distribution of the mean (unknown) – The sampling distribution of the variance.

Unit 4

Hypothesis: Tests of Hypotheses, Null Hypotheses and Alternate Hypothesis, Critical Region, Type I and Type II Errors,, Significance tests ,Level of Significance, Z-test and , χ^2 —Test of Goodness of Fit .

References:

1. Miller and Fread, "Probability and statistics for engineers – Richard A Johnson" Pearson Education Asia / PHI.
2. Ross, S.M, "Probabilty and Statics for Engineers and Scientists", 4th Edition, Elsevier.
3. S.C.Gupta & V.K.Kapoor, "Fundamentals of Mathematical Statistics" Sultan & Sons, Eastern Economy Edition.
4. Kishor S. Trivedi , "Probability And Statistics With Reliability, Queuing With Reliability, Queuing And Computer Science Application", PHI.

BTCS 402: Object Oriented Programming Structures (C++)

Unit 1

INTRODUCTION: Introducing Object-Oriented Approach Comparisons with Procedural Approach, Characteristics of Object-Oriented Languages.

BASIC TERMS AND IDEAS: Abstraction, Encapsulation, Information hiding, Inheritance, Polymorphism, Review of C, Difference between C and C++, cin, cout, new, delete operators.

Unit 2

CLASSES AND OBJECTS: Abstract data types, Object & classes, attributes, methods, Reference variable, C++ class declaration, State identity and behavior of an object, Constructors and destructors, copy Constructor, Static Class Data, inline function, default arguments, const arguments Friend Functions.

Unit 3

INHERITANCE: Inheritance, Types of Inheritance, Class hierarchy, derivation – public, private & protected, Hybrid Inheritance and virtual base class Aggregation, composition vs classification hierarchies, function overriding and constructor calls in different types of Inheritance

POLYMORPHISM: Type of Polymorphism – Compile time and runtime, Method polymorphism, Polymorphism by parameter, This Pointer ,Operator overloading and Type Conversions, Parametric polymorphism, Virtual Functions, Virtual Destructors, Generic Programming – template function and Template Classes

Unit 4

FILES AND EXCEPTION HANDLING: Console I/O :Stream, stream classes, unformatted I/O operations, formatted I/O operations, manipulators.File I/O Basics of data files, creating/ opening & closing a file, reading data from file, writing data into file, error-handing functions, random access of data files. Namespaces and Exception handling.

References:

1. Balagurusamy, *Object Oriented Programming with C++*, TMH.
2. Stephen Prata, *C++ Primer Plus*, Pearson Education.
3. Schildt Herbert, *C++: The Complete Reference*, Wiley DreamTech, 2005.
4. D . Parsons, *Object Oriented Programming with C++*, BPB Publication.
5. A R.Venugopal, Rajkumar, T. Ravishanker, *Mastering C++*, TMH, 1997.

BTCS 403: Discrete Structures

Unit 1: Propositional Calculus

Statements, Basic operations, Truth value of compound statements, Algebra of Propositions, Tautologies and contradiction, Conditional and Bi-conditional statements, logical implications, logical equivalence, predicates, Universal and existential quantifiers. Logic gates, Boolean Algebra, Postulates of Boolean Algebra; Theorems of Boolean Algebra, Sum of products and product of sums Simplification, NAND and NOR implementation.

Unit 2: Graph Theory

Fundamental concepts (basic definitions, operations, properties); Trees (properties, distances and centroids, spanning trees, enumeration); Matchings (bipartite graphs, general graphs, weighted matching); Connectivity (vertex and edge connectivity, cuts, blocks, k-connected graphs, network flows); Traversability (Eulerian tours, Hamiltonian cycles); Coloring (vertex and edge coloring, chromatic number); Planarity (duality, Euler's formula, characterization, 4-color theorem).

Unit 3: Sets:

Introduction, Set notations and description, sub-sets, Basis set operations, Venn diagrams, Combination of sets, Finite and infinite sets , Uncountable infinite sets, Mathematical induction, Principle of inclusion and exclusion.

Relations:

Definition, Properties of binary relations, Equivalence relations and partitions, Partial ordering relations. Hasse Diagrams.

Unit 4: Group Theory

Groups, semi group, infinite group, Finite group, order of a group, Abelian group, subgroup, Necessary and sufficient condition for a subset to be a subgroup of a group,

References:

1. Kenneth H. Rosen : Discrete Mathematics and its applications,5th Ed. Tata McGraw Hill (2003).
2. K.R Parthasarty : basic Graph Theory, Tata Mc-Graw Hill.
3. C. L. Liu, Elements of Discrete Mathematics, McGraw Hill International Editions.
4. J L Mott, A Kandel, T P Baker, Discrete Mathematics for Computer Scientists & Mathematicians, Prentice-Hall of India.
5. K. D. Joshi, Foundations of Discrete Mathematics, Wiley Eastern Ltd.

BTCS 404: Logic Design

Unit 1

Review of number systems, BCD, Excess-3, Gray and Alphanumeric codes. Review of Boolean algebra, De-Morgan's Theorems, Standard Forms of Boolean Expressions, Minimization-Techniques: K-MAPS, Q-M (Tabulation) method.

Unit 2

Combinational Logic Circuits: Problem formulation and design of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, ALU, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), Demultiplexers

Unit 3

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF,) Edge-Triggered Flip-Flops, Flip-Flop Operating Characteristics, Basic Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, Up/Down Synchronous Counters.

Unit 4

Shift registers & Memories, Shift Register Functions, Serial In - Serial Out Shift Registers, Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In - Parallel Out Shift Registers, Bidirectional Shift Registers.

Basics of Semiconductor Memories, Random-Access Memories (RAM), Read Only Memories (ROMs),

References:

1. **Morris Mano**, Digital Logic Design, TMH.
2. **Kumar Anand**, Digital Logic Design, PHI.
3. **Thomas L. F.**, Digital Fundamentals, Prentice Hall, Inc, 4th Edition 1997.
4. **Tocci R. J. & Widner**, Digital Systems: Principles and Applications, PHI.
5. **Gothman**, Fundamentals of Digital Electronics, PHI.

BT 407: Economics for Engineers

UNIT 1: Microeconomics

Utility analysis - Cardinal Utility, Law of diminishing marginal utility; Ordinal utility—assumptions, Indifference curves and their properties, Marginal rate of substitution, Budget line, Consumer's equilibrium using Indifference curves; Elasticity of Demand— Price, income and cross elasticity, Relationship between Elasticity and Revenue; Production function- total, average and marginal product, law of variable proportions, returns to scale; Costs- total, average and marginal, relation between average and marginal cost.

UNIT 2: Macroeconomics

National income-concept and related aggregates, measurement of national income- income, expenditure and value added method; Circular flow of income and expenditure-two, three and four sector model; aggregate demand and aggregate supply, determination of equilibrium level of income; IS-LM Model – Keynesian Version; Consumption function – short run and long run; Concept of investment multiplier and accelerator; Inflation – concept and types, theories of demand pull and cost push inflation. Philip's curve –short run and long run.

UNIT 3: Public Finance

Meaning and scope of public finance; Concept of budget and its types, measures of budget deficit- fiscal deficit, revenue deficit, and primary deficit. Taxation- types of taxes, Impact and incidence of taxation.

Criteria for public investment- Net present value and Internal rate of return; Meaning and objectives of fiscal policy, Fiscal responsibility and budget management Act; Deficit Financing—meaning, objectives and causes, Effects of deficit financing.

Suggested readings:

1. A. Koutsoyiannis, *Modern Microeconomics*, Second Edition, Macmillan Press, London.
2. D.N Dwivedi, *Microeconomics – Theory and Applications*, Pearson Publications.
3. P.A Samuelson and W. Nordhaus, *Economics*, 19th Edition, Tata McGraw Hill Publication.
4. Richard T Froyen, *Macroeconomics*, 10th Edition, Pearson Education. Delhi.
5. N. Gregory Mankiw, *Macroeconomics*, 5th Edition, Macmillan.
6. D.N Dwivedi, *Macroeconomics – Theory and Policies*, Pearson Publications.
7. H. L Bhatia, *Public Finance*, 29th Edition, Vikas Publication.
8. R.R Barthwal, *Industrial Economics- An Introductory Textbook*, New Age Publication.