LNCT University III Semester BTech. CSE Syllabus
(Batch 2020-2024)

Mathematics III (LNBTC-301)

Module 1: Numerical Methods – 1: (8 hours): Solution of polynomial and transcendental equations – Bisection method, Newton-Raphson method and Regula-Falsi method. Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

Module 2: Numerical Methods – 2: (6 hours): Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Solution of Simultaneous Linear Algebraic Equations by Gauss's Elimination, Gauss's Jordan, Crout's methods, Jacobi's, Gauss-Seidel, and Relaxation method.,

Module 3: Numerical Methods – 3: (10 hours): Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. RungeKutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator-corrector methods. Partial differential equations: Finite difference solution two dimensional Laplace equation and Poission equation, Implicit and explicit methods for one dimensional heat equation (Bender-Schmidt and Crank-Nicholson methods), Finite difference explicit method for wave equation.

Module 4: Transform Calculus: (8 hours): Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace Transform method, Fourier transforms.

Module 5: Concept of Probability: (8 hours): Probability Mass function, Probability Density Function, Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution.

Textbooks/References:
1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.

7. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
8. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
9. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968. Statistics

Discrete Structure (LNCS302)

UNIT-1:   Propositional Logic and Proof Techniques:
Syntax, Semantics, valid, satisfiable and unsatisfiable formula
Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers Theorem proving Techniques: Principles of Mathematical induction, Proof by contradiction, Forward proof, proof by contradiction.

UNIT-II: Basic Mathematical structures
Set Theory, Relation, Function, Theorem Proving Techniques
Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem.

UNIT-III: Function
Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole , Russels's Paradox, principle, Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, counting techniques

UNIT-IV: Abstract algebra
Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results. Applications to cryptography

UNIT-V: Graph Theory
Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian graphs paths and characterization, Hamiltonian paths and circuits, Graph coloring and its applications, chromatic number, Isomorphism and Homomorphism of graphs. Applications to Computer Science

Books Suggested:
- C L Liu, Elements of Discrete Mathematics, Second Edition, Tata McGraw-Hill.
- J P Tremblay and R Manohar, Discrete mathematical structures with applications to Computer Science, Tata McGraw-Hill.
- Kenneth H Rosen (Editor-in-chief), Handbook of Discrete and Combinatorial Mathematics, CRC   Education   2002.

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Object Oriented Programming System (LNCS303)

UNIT-1:   Introduction to Object Oriented Programming:
Object Oriented Concepts, Merits of Object Oriented Technology. Abstraction, Encapsulation, Information Hiding. Object Model: definition, State, behavior, Identity and messages. Concept of object initialization, constructors, constructor overloading. Access modifiers: Class attributes and methods. Introduction to object model of software development.

UNIT-II: Introduction to classes and Objects
Java features: Java syntax, data types, data type conversions, control statements, operators and their precedence. Introduction to Class: Instance members and member functions. String Handling, Wrapper classes: Arrays and Vectors.

UNIT-III: Inheritance and Polymorphism
Structure, Class Relationships, Merits and Demerits. Inheritance, Types of Inheritance, Polymorphism: Dynamic method dispatch, Runtimepolymorphism, Abstract classes.

UNIT-IV: Exception Handling and Multithreading
Exceptions: Need for exceptions, Checked Vs Unchecked exceptions, creating custom exceptions. Multithreading: Introduction, Priorities and scheduling, Inter-thread communication, Thread Synchronization and its life cycle.

UNIT-V: Java I/O, and C++ case study
Basic concept of streams I/O stream & reader-writer classes. File handling. In C++ and Java

Books Suggested:
- Cay S.Horstmann, Core JAVA Vol-1, 9/e, Pearson Education 2012.
- Herbert Schildt, The complete Reference, 9/e, Tata McGraw Hill 2014.
- Scott W Amber, The Object Primer, 3/e, Cambridge 2004.
- Timothy Budd, Object Oriented Programming, 3/e, Pearson Education 2002.

Branch-CSE

Digital Electronics (LNCS304)

UNIT-1:   Foundation

Number system, Arithmetic operations using 1's,2's complement, variouscodes, Review of basic gates, universal gate application, Logic Families: - RTL, DTL, TTL &MOS, CMOS families for NOR/NAND gate, characteristics of Digital IC's - speedof operation, power dissipation, Fan-in, Fan-out, Noise margin, Current and Voltage parameters.

UNIT-II: Combinational Circuits

Boolean laws & algebra , Sum Of Product & Product Of Sum expression, K-Map and Tabular method of minimization, Combinational devices like Multiplexer, Demultiplexer, Decoders, Encoders,Tri-state Devices, Combinational circuitdesign for Adder, Subtractor, Comparator, Code converters.

UNIT-III: Sequential Circuits

Latches and Flip-Flops SR, D, T, JK, Master-slave , Flip- Flopconversions, Synchronous counter, Asynchronous counter, Up-Down Counter.

UNIT-IV: Registers

Shift Registers, serial in parallel out, serial in serial out, parallel in serial out,parallel in parallel out, Universal Shift Register, Sequence Generators, Designing of Synchronous & Asynchronous sequential circuits.

UNIT V: A/D Conversion and Microprocessor

Digital to Analog Conversion Technique as Binary Weighted DAC, R-2R Ladder, Conversions as Flash type, Counter type , Successive Approximations type A/D converter, Clock generation through IC555, Memory- Types ROM, RAM, Introduction to Microprocessor, Microprocessor Evaluation, Programming and hardware model of Microprocessor, 8/16/32/64 bit Series of Microprocessors.

Books Suggested

- Morris Mano, Digital Circuits & Logic Design, PHI
- Gothman, Digital Electronics, PHI
- Tocci, Digital Electronics, PHI
- Mavino& Leach, Digital Principles & Applications, PHI
- Taub and schilling, Digital Integrated electronics.
- Simon Haykin, Introductionto Analog& Digital Communication, Wil

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Data Structure (LNCS305)

UNIT-I: Arrays and List
Array: Definition, Representation, Address Calculation; Searching: Linear search, Binary search;
Sorting: Bubble sort, Insertion sort, Selection sort, Radix sort, Shell sort;List: Introduction,
Implementation as Linked list, Circular linked List, Doubly linked list, Applications of linked list.

Unit-II: Stacks
Definition, Representations : static and dynamic, Implementation of stack, Applications of stack:
Polish notation representation and conversion, Tower of Honoi problem,Implementation of
recursion, Quick sort and Merge sort.

Unit-III: Queues and Hashing
Definition, Representations, Static and dynamic, Circular Queue, Doubleended Queue, Priority
Queue, Implementation of Priority Queue using Heap data structure, HeapSort, applications of
queues. Hash Structures: Representation, Search and Implementation and other issues.

Unit-IV: Trees
Definition, Basic terminology, Binary tree, Complete Binary Tree, representations: Staticand
dynamic, Traversal techniques in binary tree, Heap tree, Binary Search tree, AVL tree, Mway
search trees, B-tree & its variations.

Unit-V: Graphs
Definition, Basic terminology, Graph Types, Representations: static, dynamic;Implementations,
Searching in graphs, Shortest path in graphs, Applications.

Books Suggested:
- E. Horowitz & Sahni,Fundamental Data Structure, Galgotia Book Source, 1983.
- Tannenbaum, Data Structure Using C, Pearson Education, 2003.
- Kruz, Data Structure and Programming Design, 1987.
- N. Wirth, Algorithms +Data Structure = Program, Prentice Hall of India, 1979.
- Goodrich & Tamassia, Data Structures and Algorithms in C++, 2nd Edition, John

Computer Programming (LNCS306)

HTML
What is Markup Language, Basic Structure of HTML, Head Section and Elements of Head Section, Meta Tags, CSS Tags, Script Tag, Table Tag , Div Tag ,Anchor tags , Image Tag, Object Tag, Iframe Tag , Forms , Form Tag , Attributes of Form , POST and GET Method Text input, Text area , Checkbox and Radio Button , Dropdown, List and Opt-group , File Upload and Hidden Fields o Submit, HTML Validators, Introduction to HTML5 o Features of HTML5 , HTML5 DocType.

CSS Codes
Introduction to Cascading Style Sheets ,Types of CSS , CSS Selectors , Universal Selector ID Selector, Tag Selector , Class Selector , Sub Selector , Child Combinatory Selector CSS Properties, Type Properties , Background Properties , Block Properties , Box Properties , List Properties , Border Properties , Positioning Properties , Real-time Implementation, Converstion of Table to CSS Layout , CSS Menu Design (Horizontal, Vertical).

Javascript through JQuery
Introduction to Client Side Scripting , Introduction to Java Script , JavaScript Types , Variables in JS , Operators in JS , Conditions Statements , Java Script Loops , JS Popup Boxes , JS EventsJS Arrays , Working with Arrays , JS Objects , JS Functions , Using Java Script in Real-time Related Examples Introduction to jQuery o jQuery Features, Installing jQuery , jQuery Syntax ,jQuery Functions and form UI designing.

Node JS and Angular
JS server-side JS applications. Installing Node JS, Node JS Modules Create , publish, extend, manage, Node JS HTTP, Express, Mongo-DB, overview of structural framework Angular JS.

Introduction to web technologies
How website works, client, server, uploading, FTP,HTTP,client server scripting languages, domains hosting, Intro to CMS word press, joomla, drupal

Books Suggested:
- Mastering HTML, CSS, Javascript Web publishing HTML5 Black Book.
- JavaScript: The Definitive Guide by David Flanagan.
- Professional JavaScript for Web Developers byNicholas C. Zakas.
- Mike Cantelon, T.J. Holowaychuk, Marc Harter, Nathan Rajlich, Node. JS