CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
COMPUTER SCIENCE AND ENGINEERING
B. E. II - Year

I–Semester

THEORY						
S.No	**Code**	**Subject**	**L**	**T**	**P**	**Credits**
1	MT 211	Fourier Analysis and Partial Differential Equations	4	0	0	3
2	CS 211	Data Structures using C++	4	1	0	3
3	CS 212	Logic & Switching Theory	4	0	0	3
4	CS 213	Discrete Mathematics	4	1	0	3
5	EC 215	Basic Electronics	4	0	0	3
6	MB214	Managerial Economics and Accountancy	4	0	0	3
PRACTICALS						
7	CS 214	Data Structures Lab using C++	0	0	3	2
8	EC 218	Basic Electronics Lab	0	0	3	2
TOTAL			**24**	**02**	**06**	**22**

II–Semester

THEORY						
S.No	**Code**	**Subject**	**L**	**T**	**P**	**Credits**
1	MT 221	Complex Variables and Probability Statistics	4	0	0	3
2	CS 221	Computer Organization	4	0	0	3
3	CS 222	Programming in Java	4	1	0	3
4	CS 223	Data Communications	4	0	0	3
5	CS 224	Principles of Programming Languages	4	0	0	3
6	CS 225	Microprocessors & Microcontrollers	4	1	0	3
PRACTICALS						
7	CS 226	Java Lab	0	0	3	2
8	CS 227	Microprocessors & Microcontrollers Lab	0	0	3	2
TOTAL			**24**	**02**	**06**	**22**

MT 211

FOURIER ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS

Instruction	4L Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. Introduce the concepts of Fourier analysis & z-transforms in engineering applications.
2. Introduction of boundary value problems and their applications in Heat Transfer and wave propagation.

Course Outcomes:

1. Students must be able to apply mathematical concepts of Fourier series, Fourier Transforms in solving one dimensional wave equation, Heat equation and the two dimensional Laplace equations.

UNIT– I

Fourier Series:

Dirichlet's conditions - expansion of a given function in Fourier series. Expansion of even and odd functions in Fourier series. Change of interval, half range sine and cosine series. Complex form of Fourier series.

UNIT– II

Fourier Transforms:

Fourier integral (statement only)-Fourier transform, Inverse Fourier transform, Fourier sine and cosine transform, definitions and properties.

UNIT– III

Partial Differential Equations:

Formation of Partial differential equations by elimination of arbitrary constants and by elimination of arbitrary functions. Partial differential equations of First Order- Lagrange's Linear equation and its solution. Partial differential equations of First order but of any degree-Standard types: I- $f(p,q)=0$, $II-f(z,p,q)=0$, III- $f(x,p)=f(y,q)$ and IV- $z=px+qy+f(p,q)$ .General Method of solution: Two independent variables - Char pit's Method; three or more independent variables - Jacobi's method.

UNIT– IV

Applications of Partial Differential Equations:

Solutions of Partial differential equations by the method of separation of variables- boundary value problems. One dimensional Wave equation, one dimensional Heat equation- related problems. Laplace equation

UNIT – V

Z- Transforms: Introduction, Basic theory of Z-transforms. Z-transforms of some standard sequences, Existence of z-transform. Properties of z-transforms: Linearity, Translation, scaling properties. Initial and final vale theorems. Differentiation of
Z-transforms, convolution theorem, Solution of difference equations using
Z-transforms.

Text Books:

1. Kanti B Datta "Mathematical Methods of Science and Engineering (Aided with MATLAB)" CENGAGE Learning.
2. B.S.Grewal "Higher Engineering Mathematics", Khanna Publishers 42nd Edition.2013
3. M.D.Raisinghania , Text Book of ODE and PDE , S.Chand publishers 4th -2012

With effect from the academic year-2014-15

CS 211 DATA STRUCTURES USING C++

Instruction	4 L+1T Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives

1. To teach the importance of structuring the data for easy access and storage.
2. To teach the implementation of various data structures.
3. To acquire skills in using generic principles for data representation and manipulation with a view for efficiency, maintainability, and code reuse.

Course Outcomes

1. Student will be able to choose appropriate data structure as applied to specified problem definition.
2. Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
3. Students will be able to identify the strengths and weaknesses of different data structures and apply in various applications.
4. Students will be able to think critically for improvement in solutions.

UNIT-I

Algorithm Specification, Performance Analysis and Measurement.

Arrays: Abstract Data Types and the C++ Class, The Array as an Abstract Data Type, The Polynomial Abstract Data Type, Sparse Matrices, Representation of Arrays.

UNIT-II

Stacks and Queues: Templates in C++, The Stack Abstract Data Type, The Queue Abstract Data type, Sub typing and Inheritance in C++, Evaluation of Expressions (Infix to postfix Conversion, Postfix Evaluation).

UNIT-III

Linked Lists: Singly Linked Lists and Chains, Representing Chains in C++, The Template Class Chain, Circular Lists, Linked Stacks and Queues, Polynomials, Sparse Matrices, Doubly Linked Lists, Generalized Lists.

UNIT-IV

Trees: Introduction, Binary Trees, Binary Tree Traversal, Threaded Binary Trees, Heaps, Binary Search Trees.

Graphs: The Graph Abstract Data Type, Elementary Graph operations (dfs and bfs), Minimum Cost Spanning Trees (Prim's and Kruskal's Algorithms).

UNIT-V

Sorting: Insertion sort, Quick sort, Heap sort, Sorting on Several Keys, Summary of Internal Sorting.

Hashing: Static Hashing.

Efficient Binary Search Trees: AVL Trees, Red-Black Trees, Splay Trees, m-way Search Trees, B-Trees.

Text Books:

1. Ellis Horowitz, Dinesh Mehta, S. Sahani. Fundamentals of Data Stuctures in C++, Universities Press. 2007.
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education Fourth Edition, 2013.

Suggeted Reading:

1. Richard F. Gilberg & Behrouz A. Forouzan. Data Structures A Pseudocode Approach with C, CENGAGE Learning Second edition, 2005.
2. Jean-Paul Tremblay, P. G. Sorenson Introduction to Data Structure and its Applications, Mc Graw-Hill, 1984.

With effect from the academic year-2014-15

CS 212 LOGIC AND SWITCHING THEORY

Instruction	4 Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives

1. To understand the architecture of basic building blocks, logic gates , Adders, Subtractors and Multipliers and other digital devices.
2. To understand the logic of minimization techniques including Quine-Mcclusky method.
3. To analyze and design the Combinational and Sequential circuits.
4. To familiarize the notations of HDL descriptions in VHDL.

Course Outcomes

1. Ability to Design basic digital circuits in Computer Hardware and system.
2. Ability to use high level Hardware Description languages such as VHDL for the design of Combinational and Sequential circuits.

UNIT-I

Digital Computers and Information: Information representation, Computer Structure.
Number Systems: Binary Numbers, Octal and Hexadecimal Numbers, Number Ranges.
Arithmetic Operations: Conversion from Decimal to other bases. Binary Addition and Subtraction.BCD Addition.
Alphanumeric Codes: ASCII Character Code, Parity Bit.
Binary Logic and Gates: Binary Logic, Logic Gates.
Boolean Algebra: Basic Identities, Algebraic Manipulation, Complement of a function.
Standard Forms: Miniterms and Maxterms, sum of products and products of sums.

UNIT-II

Minimization of Switching Functions: Introduction, the map method, minimal functions and their properties, the tabulation procedure, the prime implicant chart.
NAND and NOR Gates: NAND Circuits, Two-level Implementation, Multilevel NAND Circuits, NOR Circuits.
Exclusive or Gates: Odd Function, Parity Generation and Checking.

UNIT – III

Combinational Logic Design: Combinational Circuits, **Design Topics:** Design Hierarchy, Top-Down design, Computer Aided Design. Hardware Description Languages, Logic Synthesis.
Analysis Procedure: Derivation of Boolean Functions, Derivation of the Truth Table, Logic Simulation,
Design Procedure: Decoders, Encoders, Multiplexers, Binary Adders, Binary Subtractor, Binary Multiplier, HDL Representations – VHDL.

UNIT-IV

Sequential Circuits: Sequential circuit definitions, Latches, Flip Flops, sequential circuit analysis, sequential circuit design, design with D Flip-Flops, designing with JK Flip-Flops, HDL representation for sequential circuits – VHDL.

UNIT – V

Registers and Counters : Registers, Shift registers, Synchronous Binary counters, Ripple counter.
Symmetric functions and Networks: Properties and identification of symmetric functions. Symmetric Networks.

Text Books:

1. M. Moris Mano, Charles R. Kime, Logic and Computer Design Fundamentals, 2nd edition, Pearson Education Asia, 2001. .
2. Zvi Kohavi, Switching and Finite Automata Theory, 2nd edition, Tata McGraw Hill, 1995.

Suggested Reading:

1. H.T. Nagle, Introduction to Computer logic, Prentice Hall, 1975.
2. Charles H. Roth, Jr Fundamentals of Logic Design, 5th edition, Thomson, Brook, Cole, 2005.

With effect from the academic year-2014-15

CS 213 DISCRETE MATHEMATICS

Instruction	4L+1T Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives

1. To introduce Mathematical Logic, especially First Order Logic to students intending to graduate in Computer Science.
2. To introduce proof techniques such as Mathematical Induction and Contradiction.
3. To Develop an understanding of counting, functions and relations.
4. To make the students familiar with fundamental notions and applicability of algebraic systems and graph theory.

Course Outcomes

1. Distinguish between Propositional Logic and Predicate Logic.
2. Apply induction and other proof techniques towards solving recurrences and other problems in elementary algebra.
3. Have an understanding of elementary combinatorics.and distinguish between functions and relations.
4. Deal with problems which may arise in Computer Science and Engineering in near future and be better equipped for examinations involving placement opportunities

UNIT-I

Fundamental Principles of counting: The Rules of Sum and Product, permutations, Combinations: Binomial Theorem
Introduction to Propositional Calculus: Basic Connectives and Truth tables, Logical Equivalence: Laws of Logic, Logical Implication: Rules of Inference.
Predicates: The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems

UNIT-II

Sets: Sets and Subsets, Operations on sets and the Laws of Set Theory, Counting and Venn Diagrams
Relations and Functions: Cartesian Products and Relations, Functions:one-one and Onto Pigeonhole principle, partial ordering relations, POSET, hasse diagrams, Equivalence relations.

UNIT-III

Generating function: Generating Functions, Function of Sequences, Calculating Coefficient of generating function.
Recurrence Relations: The First Order Linear Recurrence Relation, Second Order Linear. Homogenous Recurrence relations with constant coefficients, NonHomogenousRecurence relations.

UNIT-IV

Introduction to graphs: Graphs and their basic properties - degree, path, cycle, Sub graphs, Complements and Graph Isomorphism, Euler trails and circuits, planar graphs, Hamiltonian paths and cycles, Graph Coloring and Chromatic polynomial
Trees: Definitions, Properties, Rooted Trees, Spanning Trees, Minimum Spanning trees : The Algorithms of Kruskal and Prim.

UNIT-V

Algebraic Structures: Algebraic Systems: Examples and General Properties, Semigroups and Monoids, Groups: Definitions and Examples, Subgroups and Homomorphisms.
Lattices: Lattices as Partially Ordered Sets, Lattices as Algebraic Systems.

Text books:

1. Ralph P. Grimaldi, Discrete and Combinatorial Mathematics, An Applied Introduction, 4th edition, Pearson Education, 2003.
2. J.P. Tremblay, R.Manohar, Discrete Mathematical Structures with Applications to Computer Science, TATA McGraw-Hill Edition,1995.

Suggested Readings :

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th edition, Tata McGraw-Hill, 2005.

2. Joe L.Mott, Abraham Kandel, Theodore P. Baker, Discrete Mathematics for Computer Scientists & mathematicians, 2nd Edition , PHI ,1986.
3. David D.Railey,Kenny A.Hunt, Computational Thinking for the modern problem solving, CRC Press,2014.
4. Uwe Naumann,Olaf Scherk, Combinatorial Scientific Computing,CRC Press,2012.

With effect from the academic year-2014-15

EC 215 **BASIC ELECTRONICS**
(Common for CSE, IT, MECH, PROD)

Instruction	4 Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessional	25 Marks
Credits	3

Course Objectives:
1. To understand the knowledge of basic semiconductor devices and create foundation for forthcoming circuit design courses.
2. To understand various applications like amplifiers, oscillators and op-amps also motivate and train students in logic design.
3. To understand the working principle of the transducers and aware the students about the advances in Instrumentation.

Course Outcomes:
1. Ability to understand the usefulness of semiconductor devices in circuit making like rectifiers, filters, regulators etc.
2. Ability to develop new directions in logic design to analyze, design and implement combinational circuits.
3. Ability to analyze the principles and practices for instrument design to development the real world Problems.

UNIT – I
Semiconductor Theory: Energy levels, Intrinsic and Extrinsic Semiconductor, Mobility, Diffusion and Drift current, Hall effect, Law of mass action, Characteristics of P-N Junction diode, current equation, Parameters and Applications.
Rectifiers: Half wave and Full wave Rectifiers Bridge and center tapped with and without filters, Ripple factor, regulation and efficiency.

UNIT – II
Transistors: Bipolar and field effect transistors with their h-parameter equivalent circuits, Basic Amplifiers classification and their circuits (Qualitative treatment only).
Regulators and Inverters: Zener Diode**,** Breakdown mechanisms, Characteristics, Effect of Temperature, Application as voltage regulator

UNIT-III
Feedback Amplifiers: Properties of Negative Feedback Amplifier, Types of Negative Feedback, Effect of negative feedback on Input impedance and Output impedance,Appilications (Qualitative treatment only)
Oscillators: principle of oscillations, LC Type-Hartley, Colpitts and RC Type- Phase shift, Wien Bridge and Crystal Oscillator (Qualitative treatment only).

UNIT – IV
Operational Amplifiers: Basic Principle, Ideal and practical Characteristics and Applications-Summer, Integrator, Differentiator, Instrumentation Amplifier.
Digital System: Review of basic gates, Universal gates, Demorgan's theorem, minimization with Karnaugh Map up to three variables and realization of half, Full Adder and half, Full Sub tractors.

UNIT – V
Data Acquisition systems: Study of transducers-LVDT, Strain gauge
Photo Electric Devices and Industrial Devices:
Photo diode, Photo Transistor, LED, LCD, SCR, UJT Construction and Characteristics and their applications only.
Display Systems: Constructional details of C.R.O and Applications

Text Books:
1. Robert L. Boylestad, Louis Nashelsky, K.Lal Kishore, Electronic Devices and Circuits Theory, Pearson Education, 9TH edition, LPE, Reprinted, 2006.
2. S.Shalivahan, N. Suresh Kumar, A Vallavea Raj, Electronic Devices and Circuits, Tata McGraw Hill, 2003
3. Morris Mano, Digital Design, Pearson Education, Asia 2002.

Suggested Reading:

1. Jacob Milman and C., Halkias, Electronic devices, Mc Graw Hill, Eight Edition, Reprinted, 1985.
2. Ramakanth A. Gayakwad, Op-AMPS and Linear Integrated Circuits, Prentice Hallof India, 3rd edition,1985
3. W. D.Cooper, A. Helfric, Electronic Instrumentation and Measurement Techniques, PHI, 4th edition.

With effect from the academic year-2014-15

MB 214 MANAGERIAL ECONOMICS AND ACCOUNTANCY

Instruction:	4L periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Internal Examination	20 Marks
Case Study/ Assignment	5 Marks
Credits	3

Course Objectives:

1. The objective of the course is to provide the analytical tools and managerial insights that are essential for the solution of those business problems that have significant consequences for the firm and society.

Course Outcomes:

The student will be able to:

1. apply the concepts and principles of managerial economics in the business situations.
2. understand the capital management techniques and procedures in accountancy.

UNIT-I

Introduction to Managerial Economics

Introduction to Economics and its evolution - Managerial Economics - its scope, importance, Its usefulness to engineers - Basic concepts of Managerial economics.

UNIT-II

Demands Analysis

Demands Analysis - Concept of demand, determinants, Law of demand, its assumptions, Elasticity of demand, price, income and cross elasticity, Demand Forecasting - Markets Competitive structures, price-output determination under perfect competition and Monopoly. (Theory questions and small numerical problems can be asked).

UNIT-III

Production and Cost Analysis

Theory of Production - Firm and Industry - Production function - input-out relations - laws of returns - internal and external economies of scale. Cost Analysis: Cost concepts - fixed and variable costs - explicit and implicit costs out of pocket costs and imputed costs - Opportunity cost - Cost output relationship - Break-even analysis. (Theory and problems).

UNIT-IV

Capital Management

Capital Management, its significance, determinants and estimation of fixed and working capital requirements, sources of capital - Introduction to capital budgeting, methods of payback and discounted cash flow methods with problems.
(Theory questions are numerical problems on estimating working capital requirements and evaluation of capital budgeting opportunities can be asked).

UNIT-V

Accountancy

Book-keeping, principles and significance of double entry book keeping, Journal, Subsidiary books, Ledger accounts, Trial Balance concept and preparation of Final Accounts with simple adjustments.
(Theory questions and numerical problems on preparation of final accounts, cash book, petty cash book, bank reconciliation statement).

Text Books:

1. Mehta P.L., "Managerial Economics – Analysis, Problems and Cases", Sulthan Chand & Son's Educational publishers, 2011.
2. Maheswari S.N. "Introduction to Accountancy", Vikas Publishing House, 2005.
3. Panday I.M. "Financial Management", Vikas Publishing House, 2009.

Suggested Reading:

1. Varshney and KL Maheswari, Managerial Economics, Sultan Chand, 2001.

2. M.Kasi Reddy and S.Saraswathi, Managerial Economics and Financial Accounting, Prentice Hall of India Pvt Ltd, 2007.
3. JC Pappas and EF Brigham, Managerial Economics.

With effect from the academic year-2014-15

CS 214 DATA STRUCTURES LAB USING C++

Instruction	3 Periods per week
Duration of Main Examination	3 Hours
Main Examination	50 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. Design and construct simple programs with object oriented features.
2. To enhance programming skills while improving their practical knowledge in data structures.
3. To strengthen the practical ability to apply suitable data structure for real time applications.

Course Outcomes:

1. To be able to write object oriented programs for different data structures.
2. Understand and use the common data structures like Arrays, Linked lists, Trees Graphs etc. in various applications.

List of Experiments:

1. Implementation of Stacks using arrays and linked lists.
2. Implementation of Queues using arrays and linked lists.
3. Implementation of Infix to Postfix Conversion.
4. Implementation of evaluation of postfix expression.
5. Implementation of Polynomial arithmetic using linked list.
6. Implementation of Static Hashing (Use Linear probing for collision resolution).
7. Implementation of Merge and Quick sorts.
8. Implementation of Heap Sort.
9. Implementation of Radix Sort.
10. Implementation of Breadth first search and depth first search on graphs.
11. Implementation of Tree Traversals on Binary Trees.
12. Group Projects on Applications of Various Data Structures like Mazing Problem(using Stacks), Threaded Binary Tree, Minimum Spanning Tree(Prim's and Krukals), Huffmann Coding, B-Tree, AVL Tree, Sparse Matrices

Suggested Reading:

1. Michael T.Goodrich, Roberto Tamassia,, David M.Mount, Data Structures and Algorithms in C++, John Wiley &Sons,2nd edition,2003.
2. Stefan Brandle, Jonathan Geisler, James Roberge, David Whittington , C++ Data Structures, A laboratory Course, Jones &Bartlett Publishers, 3rd edition,2008.

With effect from the academic year-2014-15

EC 218 **BASIC ELECTRONICS LAB**
(Common for CSE, IT, MECH, PROD)

Instruction	3 Periods per week
Duration of Main Examination	3 Hours
Main Examination	50 Marks
Sessional	25 Marks
Credits	2

Course Objectives:

1. To study the electronics components.
2. To study characteristics of semi-conductor devices.
3. To study simple electronic circuits.

Course Outcomes:

The student will be able to

1. Understanding the knowledge regarding electronics components and equipment.
2. Design various rectifiers and filters. Analysis of characteristic behavior of BJT,FET.
3. Design of an amplifier.
4. Verify the operation of Op-amp for various applications.

List or Experiments:

1. Study of Electronic components.
2. Characteristics of Semiconductor diodes (Ge, Si and Zener).
3. CRO and its Applications.
4. Half, Full wave rectifiers with and without filters.
5. Voltage Regulator using zener diode.
6. Characteristics of BJT in CE Configuration.
7. Characteristics of FET in CS Configuration.
8. Amplifier with and without feedback.
9. RC Phase shift oscillator
10. Operational Amplifier and its applications.
11. Verification of Logic gates
12. Realization of Half and Full adder

Suggested Reading:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, Basic Electronics, A Text - Lab Manual, 7th Edition, TMH,1994.
2. Paul B. Zbar, Industrial Electronics, A Text - Lab Manual, 3rd Edition,

With effect from the academic year-2014-15

MT 221 COMPLEX VARIABLES AND PROBABILITY STATISTICS

Instruction	3 Periods per week
Duration of Main Examination	3 Hours
Main Examination	50 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. Extension of Laplace transforms in solving the Integral equations
2. Introduction of the Concept of analyticity of complex functions and contour Integrations and conformal Mapping.
3. Introduction of Basic Probability, Probability distributions and sampling theory.

Course Outcomes:

1. Students must be able to apply the concepts learned in potential Theory, electromagnetic theory.
2. Students must realize the Probability & Statistics and its wide applications in various Branches of Engineering and science. Students must be able to analyze the Random phenomena of any Physical system.

UNIT-I: Applications of Laplace transforms to Integral equations:

Laplace transforms of special functions-Bessel function and error functions. Definitions of Integral transforms, kernel of the transform. Solution of Integral equations; Abel's integral equation, Integral equation of the convolution type and Integro-differential equations. Solutions of partial differential equations- Boundary value problems.

UNIT: II Complex Variables:

Analytic function, Cauchy Riemann equations (Cartesian and polar forms) - construction of Analytic functions. Harmonic function, derivatives of Analytic functions.

Complex line integrals, Cauchy's Integral theorem, Cauchy's Integral formula and its derivatives and problems related to the above theorems.

UNIT-III: Complex Variables:

Taylor's and Laurent's expansions-zeros, types of singularities and residues. Cauchy's Residue theorem. Evaluation of real definite integrals by Cauchy's residue theorem.

Elementary transformations and conformal Mapping.

UNIT-IV: Statistics and Basic Probability

Correlation -Correlation coefficient between two variables, Rank correlationand Regression- lines, random variables, distributions- probability mass function and probability density function. Conditional distributions-Bayes' Theorem-Mathematical expectation- expected values- moments and moment generating function- Characteristic function.

UNIT-V:Probability Distributions: Binomial, Poisson, and Uniform (rectangular), Normal, exponential, Gamma and Beta distributions. Test of hypothesis using Chi-square test for goodness of fit, t-test, F-test.

Text Books:

1. Mathematical Methods of Science and Engineering (Aided with MATLAB) By KantiB.Datta CENGAGE Learning.
2. Fundamentals of Mathematical Statistics by Gupta and Kapoor
3. Higher Engineering Mathematics by B.S.Grewal.

CS 221 COMPUTER ORGANIZATION

Instruction	4 Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives

1. To understand the operation, interaction, communication among the functional units of a Computer System.
2. To understand the factors and trade-offs that affect computer performance.
3. To understand the concrete representation of data at the machine level and how computations are performed at the machine level.

Course Outcomes

1. Ability to understand the merits and pitfalls in computer performance measurements.
2. Ability to understand memory hierarchy and its impact on computer cost/ performance.
3. Technical knowledge of the advantage of instruction level parallelism and pipelining for high performance processor design.

UNIT-I

Introduction:

Von-Neumann Architecture, Computer Organization, Computer Architecture, Differences.

Register Transfer and Microoperations:

Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design:

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic.

UNIT-II

Microprogrammed Control:

Control Memory, Address Sequencing, Microprogram Example, Design of Control Unit.

Central Processing Unit:

General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

UNIT-III

Pipeline and Vector Processing:

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Computer Arithmetic:

Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating Point Arithmetic Operations, Decimal Arithmetic Unit.

UNIT-IV

Input-Output Organization:

Input -Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication.

UNIT-V

Memory Organization:

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Text Books:

1. M. Morris Mano, Computer System Architecture, 3rd Edition, Pearson Education Asia, 2002.
2. William Stallings, Computer Organization & Architecture, 6th Edition, Pearson Education Asia, 2003.

Suggested Reading:

1. V. Carl Hamacher, Z. G. Vranesic, S. G. Zaky, Computer Organization, Mcgraw Hill,2004.
2. Mehdi Zargham,Computer Architecture, Prentice Hall, 1996.
3. John L. Hennessy,David A. Patterson, Computer Architecture: A Quantitative Approach, 5th Edition, Morgan Kaufmann, 2006.

CS 222 Programming in JAVA

Instruction	4L+T Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:
1. Cover issues related to the definition, creation and usage of classes, objects and methods.
2. To expose and explain Java exception handling and Multi threading to the students.
3. Cover the basics of creating Java Collection Framework through programming.
4. To expose GUI programming and transfer data to and from computer files

Expected Learning Outcomes:
Upon completion of this class, students should be able to:
1. Identify classes, objects, members of a class and the relationships needed for a problem.
2. Create exception handling and Multithreading in Java programs.
3. Develop programs using the Java Collection API as well as the Java standard class library
4. To place GUI components and create files and read from computer files using Java

UNIT-1
Introduction: Introduction to java, Advantages of java.
Java Programming Fundamentals: Data Types, Variables, Arrays, operators, control statements, classes, methods, inheritance, packages and interfaces.

UNIT-2
Exception handling, Multi Threading, IO Basics, Reading console input and output, reading and writing files and String handling.

UNIT-3
Collections Overview, Interfaces, Classes, Iterators, Maps, Comparators, Legacy Classes and Interfaces, String Tokenizer, BitSet, Date, Calendar.

UNIT-4
Graphics Programming: Introduction to AWT Toolkit class Hierarchy, Frames, Panels, Canvases, Layout Managers,Color class,Font Class,Drawing Geometric Figures
Creating User Interfaces:Labels, Buttons, Text Fields, Text Areas, Check boxes, Checkbox Group, Choice control, Lists, Scrollbars, Menus Event Handling mechanisms, Delegation Event Modeling, Event listener Interfaces
Applets,Mouse Events and key Events.

UNIT-5
IO Basics, Classes and Interfaces, Streams of Byte Classes, Character Streams, Serialization.

Text Books:

1. Herbert Schildt , The Complete Reference Java, 7th Edition, Tata McGraw-Hill 2007.
2. Herbert Schildt & Dale Skrien ,Java Fundamentals- A Comprehensive Introduction , 2013 Edition, Tata McGraw-Hill.

Suggested Reading :

1. C Thomas Wu ,An introduction to Object Oriented Programming with Java,5th Edition Tata McGraw Hill 2009.
2. Joe Wigglesworth and Paula McMillan ,Java Programming: Advanced Topics, 3rd Edition, Cenage Learning 2013 .
3. James M slack ,Programming and Problem Solving with JAVA, 1st Edition ,Thomson Learning 1999.

CS 223 **DATA COMMUNICATIONS**

Instruction	4 Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives

1. To obtain insight about the basics of Data Communications and Networking.
2. To understand the fundamentals of data and signal transmission through guided and unguided media.
3. To gain knowledge about the layered communication architecture (OSI and TCP/IP) and its functionalities.
4. To understand the principles, protocols and transmission standards used in data link layer.
5. To obtain insight about wired and wireless LAN technology in today's communication world.

Course Outcomes

1. Understand the fundamental concepts of Data Communication and networking.
2. Able to describe communication protocols and layered network architectures.
3. Able to describe how the physical and data link layers operate in a typical data communication system.

UNIT-I

Introduction: Data Communications, Networks, The Internet, Protocols and Standards.
Network Models: Layered Task, OSI Model, Layers in OSI Model, TCP/IP Protocol Suite, Addressing.
Data and Signals: Analog and Digital, Periodic Analog Signal, Digital Signal, Transmission Impairments, Data Rate Limits, Performance.
Transmission Media: Guided Media, Unguided Media.

UNIT-II

Digital Transmission: Digital to Digital Conversion, Analog to Digital Conversion, Transmission Modes.
Bandwidth Utilization: Multiplexing, Spread Spectrum, Digital Subscriber line.
Switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Network.

UNIT-III

Error Detection and Correction: Introduction, Block Coding, Linear Block Codes, Cyclic Codes, Checksum.
Data Link Control: Framing, Flow and Error Control, Protocols, Noiseless Channels, Noisy Channels, HDLC.

UNIT-IV

Multiple Accesses: Random Access, Controlled Access, Channelization.
Connecting Networks: Connecting Devices, Backbone Network, Virtual LAN.
Virtual Circuit Network: Frame Relay, ATM, ATM LANs.

UNIT-V

Wired LANs: IEEE Standard, Standard Ethernet, Changes in the Standard, Fast Ethernet, Gigabit Ethernet.
Wireless LANs: IEEE 802.11, Bluetooth.
Wireless WANs: Cellular Telephony.

Text Books:

1. Behrouz A. Forouzan, Data Communication and Networking , 4th Edition, Tata McGraw Hill, 2006 .
2. William Stallings, Data and Computer Communication, 7th edition, Pearson Education, Asia 2004.

Suggested Reading:

1. 'Computer Networks' - A Top down approach Behrouz Forouzan, Firouz Mosharraf-Mcgrawhill,2011.

With effect from the academic year-2014-15

CS 224 PRINCIPLES OF PROGRAMMING LANGUAGES

Instruction	4 Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives

1. To provide an introduction to formalisms for specifying syntax and semantics of programming languages
2. To provide an exposure to core concepts and principles in contemporary programming languages
3. To analyze and optimize the complexity of the programming languages.
4. To explore the concept of concurrent and parallel programming

Course Outcomes

1. Ability to program in different language paradigms and evaluate their relative benefits
2. Gains knowledge of, and ability to use, language features in current programming languages
3. Ability to develop algorithms for problem solving

UNIT – I

The Role of programming Languages: Towards Higher-level Languages, Programming Paradigms , Criteria for good language design and Language implementation.

Language Description : Expression notation , Abstract syntax tree, Context free Grammars

UNIT – II

Structured Programming : Need for Structured programming, Design considerations, Handling special cases in loops, Programming with invariants, Control flow in C.

Types – Role of Types, Basic Types, Arrays, Records, Unions, Sets, Pointers, Types and Error Checking.

Procedure Invocation: Introduction to Procedures, parameter passing methods, Scope Rules for Names, Nested Scopes, Activation Records.

UNIT – III

Object-Oriented Programming –Object**,** Object –oriented thinking , Classes in C++ - Over loading , Derived classes , Information hiding , Inheritance and polymorphism , Generic functions, Objects in Smalltalk.

Concurrent Programming – Parallelism in Hardware, Liveness properties, Synchronization, Concurrency in Ada.

UNIT – IV

Functional Programming - Introduction to LISP, Exploring a List, Functions as First-class values, ML: types, function, List manipulation, Exception Handling in ML, Storage allocation for lists

UNIT – V

Logic Programming - Computing with relations , Introduction to Prolog , Data structures in Prolog , Programming techniques , Control in Prolog , Cuts.

Text Books:

1. Ravi Sethi, "Programming Languages", II Ed., Pearson Education asia , 2001
2. Winston, LISP , 2nd edition, Pearson Education asia , 2001

Suggested Reading :

1. Robert W. Sebesta, "Concepts of Programming languages", 7th Edition., Pearson Education,2010
2. Daniel P. Friedman , Mitchell Wand, " Essentials of Programming Languages" , 3rd edition PHI ,2009.
3. Kenneth C.Louden "Programming Languages principles and Practice",2nd Edition, Cengage Learning 2003.

CS 225 MICROPROCESSORS & MICRO CONTROLLERS

Instruction	4 Periods per week
Duration of Main Examination	3 Hours
Main Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course objectives

1. To understand Microprocessor types and Programming.
2. To understand various interfacing concepts.
3. To understand basic concepts of microcontroller 8051 and interfacing concepts**.**

Course outcomes

Students should be able to:

1. Identify the basic element and functions of microprocessor and microcontroller.
2. Describe the architecture of microprocessor and its peripheral devices.
3. Demonstrate fundamental understanding on the operation between the microprocessor and its interfacing devices.
4. Apply the programming techniques in developing the assembly language program for microcontroller application.

UNIT –I

8085 Architecture Introduction to microprocessors and microcontrollers, 8085 Processor Architecture, Internal operations, Instructions and timings.Programming,Introduction to 8085 instructions, Addressing modes and Programming techniques with Additional instructions

UNIT-II

Stacks and subroutines, interfacing peripherals- Basic interfacing concepts, Interfacing output displays, Interfacing input keyboards. Interrupts-8085 Interrupts, Programmable Interrupt Controller(8259A).Direct Memory Access(DMA)-DMA Controller(Intel 8257), Interfacing 8085 with Digital to Analog and Analog to Digital Converters.

Unit III

Interfaces : Programmable Peripheral Interface(Intel 8255 A), Programmable communication interface(Intel 8251), Programmable Interval Timer(Intel 8253 and 8254), Programmable Keyboard /Display controller(Intel 8279).

Unit IV

8086 Architecture and Instruction set: 8086 Block diagram, register structure, Minimum and Maximum mode operations, Addressing modes,Instruction set.Features of advanced processors 80386 , 80486, Pentium and Pentium-Pro Processors.

Unit V

Introduction to microcontrollers, 8051 architecture, Instruction set, Addressing modes, programming techniques. Interfacing of LCD, Stepper motor, ADC, DAC.

Text Books:

1. Ramesh S. Gaonkar, Microprocessor Architecture, Programming and Applications with 8085, 5th Edition, Prentice Hall, 2002.
2. Kenneth Ayala " The 8051 Microcontroller: 3rd Edition, Cengage Learning,2004.
3. Brey B.Brey, The Intel Microprocessor, 8086/8088,80186/80188,80286,80386,80486, Pentium and Pentium Pro-Processors-Architecture, Programming and interfacing 4th Edition, Prentice Hall, 1993

Suggested Reading:

1. Douglas Hall. "Microprocessor and Interfacing programming and Hardware", Tata Mc Graw Hill, Revised 2nd Edition,2007.
2. Liu, Gibson. "Microcomputer Systems: The 8086/88 family", 2nd Edition,2005.
3. Myke Predko, Programming and customizing the 8051 Microcontroller, Tata McGraw –Hill , 1994.
4. Mazidi M.A, Mazidi J.G & Rolin DMckinlay, "The 8051 Microcontroller & Embedded Systems using Assembly and C,"2/e, Pearson Education, 2007.

CS 226 **JAVA LAB**

Instruction	3 Periods per week
Duration of Main Examination	3 Hours
Main Examination	50 Marks
Sessionals	25 Marks
Credits	2

Course Objectives:
1. Cover the basics of creating Java programming, Multi threading, Exception handling etc.
2. To expose GUI programming.

Course Outcomes:
1. Develop programs using the Java Concepts.
2. Small Applications Development using GUI and I/O Streams.

1. A program to illustrate the concept of class with constructors, methods and access levels .
2. A program to illustrate the concept of inheritance and polymorphism.
3. A program to illustrate the usage of abstract, final and static classes and methods.
4. A program to illustrate the concept of multi threading and thread synchronization.
5. A program to illustrate the concept of strings and stringtokenizer.
6. A program using ArrayList and LinkedLIst and iterator classes.
7. A program using TreeSet, HashSet and LinkedHashSet .
8. A program using Map Classes
9. A program using Enumeration and Comparator Interfaces
10. An application involving GUI with different controls, menus, Scrollbar and Event handling.
11. A program to implement Applet.
12. A program to illustrate the usage of all I/O Streams
13. A program to illustrate the usage of Serialization
14. Case Study using GUI and Threads.

Suggested Reading :

1. Herbert Schildt , java Fundamentals , Indian Edition,McGraw hill 2013.
2. Wigglesworth and Mcmillan ,Java Programming: Advanced Topics, 3rd Edition, Cenage learning 2013.

CS 227 **MICROPROCESSORS & MICRO CONTROLLERS LAB**

Instruction	3 Periods per week
Duration of Main Examination	3 Hours
Main Examination	50 Marks
Sessionals	25 Marks
Credits	3

Course Objectives

1. Familiarize the architecture of 8085 processor, assembly language programming and interfacing with various modules.
2. To understand 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.
3. To design & develop different type of embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.

Course Outcomes

1. Analyze and apply working of 8085.
2. Compare the various interface techniques. Analyze and apply the working of 8255, IC and design and develop the programs.
3. Analyze and apply working of 8051.
4. Analyze interfacing of various devices with microcontroller.

PART A : 8085 programming using microprocessor trainer kit

1. Simple programming examples using 8085 instruction set. To understand the use of various instructions and addressing modes.
2. Interfacing and programming of 8255(traffic light controller)
3. Interfacing and programming of 8255(seven segment display)
4. Interfacing and programming of 8255(led matrix display)

PART B: 8051 programming

1. Simple programming examples using 8051 microcontroller.
2. A/D converter interface
3. D/A converter interface
4. Stepper motor interface

Suggested Reading:

1. Ramesh S.Gaonkar, Microprocessor Architecture &Applications with 8085, 5th Edition, Prentice Hall,2002.
2. Kenneth Ayala " The 8051 Microcontroller: 3rd Edition, Cengage Learning,2004.
3. Mazidi M.A, Mazidi J.G & Rolin DMckinlay, "The 8051 Microcontroller & Embedded Systems using Assembly and C,"2/e, Pearson Education, 2007.