Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Information Technology)

Choice Based Credit System (CBCS) 2016-17

SEMESTER I

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMA101		APPLIED MATHEMATICS-I	60	20	20	-	-	3	1	-	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:-

1. To introduce the students with the Fundamentals of the Differential, Integral, Vector Calculus and Numerical Analysis.

Course Outcomes:

After the successful completion of this course, students will be able:

1. To understand and apply the basics of the differential calculus.
2. To know the fundamental principles of the integral calculus and apply them.
3. To apply the techniques in the numerical analysis.
4. To know the numerical solution of the system of linear algebraic equations.
5. To understand and apply the basics of the vector calculus.

Syllabus

Unit-I: Differential Calculus

Limits of functions, continuous functions, uniform continuity, montone and inverse functions. Differentiable functions, Rolle's theorem, mean value theorems and Taylor's theorem, power series. Functions of several variables, partial derivatives, chain rule, Tangent planes and normals. Maxima, minima, saddle points, Lagrange multipliers, exact differentials.

Unit-II: Integral Calculus

Riemann integration, fundamental theorem of integral calculus, improper integrals. Application to length, area, volume, surface area of revolution. Multiple integrals with application to volume, surface area, Change of variables.

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Unit– III: Numerical Analysis

Number Representation and Errors: Numerical Errors; Floating Point Representation; Finite Single and Double Precision Differences; Machine Epsilon; Significant Digits. Numerical Methods for Solving Nonlinear Equations: Method of Bisection, Secant Method, False Position, Newton - Raphson's Method, Multidimensional Newton's Method, Fixed Point Method and their convergence.

Unit– IV: Numerical Analysis

Numerical Methods for Solving System of Linear Equations: Norms; Condition Numbers, Forward Gaussian Elimination and Backward Substitution; Gauss-Jordan Elimination; FGE with Partial Pivoting and Row Scaling; LU Decomposition; Iterative Methods: Jacobi, Gauss Siedal; Power method and QR method for Eigen Value and Eigen vector.

Unit– V: Vector Calculus

Gradient and directional derivative. Divergence and Curl of Vector point function, line and surface integrals. Green's, Gauss' and Stokes' theorems and their applications.

Texts:

1. *T. M. Apostol, Calculus, Volume I, 2nd Ed, Wiley, 1967.*
2. *T. M. Apostol, Calculus, Volume II, 2nd Ed, Wiley, 1969.*
3. *K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).*
4. *S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill,2005.*
5. *B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi*

References:

1. *R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley, 1999.*
2. *J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.*
3. *J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.*
4. *J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw-Hill, 2001.*
5. *M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi, 2004.*
6. *S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw-Hill 2008.*

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTPH101		APPLIED PHYSICS	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:-

1. To develop the comprehensive understanding of laws of physics.
2. To develop ability to apply laws of physics for various engineering applications.
3. To develop the experimental skills, ability to analyze the data obtained experimentally to reach substantiated conclusions.

Course Outcomes:-

1. Student will be able to comprehend laws of physics.
2. Student will be able to apply laws of physics for various engineering applications.
3. Student will be able to determine physical parameter experimentally and will be able to ana-lyze the data obtained experimentally to draw substantiate conclusions.

Syllabus

Unit-I: Quantum Physics

Introduction to Quantum hypothesis, Matter wave concept, Wave Group and Particle velocity and their relations, Uncertainty principle with elementary proof and applications to microscope and single slit, Compton Effect, Wave function and its physical significance. Development of time dependent and time independent Schrodinger wave equation, Applications of time independent Schrodinger wave equation

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Unit-II: Solid State Physics

Free electron model, Qualitative Analysis of Kronig Penney Model, Effective mass, Fermi Level for Intrinsic and Extrinsic semiconductors, P-N junction diode, Zener diode, Tunnel diode, Photodiode, Solar- cells, Hall Effect, Introduction to Superconductivity, Meissner effect, Type I & II Superconductors.

Unit-III: Nuclear Physics

Nuclear Structure & Properties Nuclear models: Liquid drop with semi-empirical mass formula & shell model. Particle accelerators: Cyclotron, Synchrotron, Betatron. Counters and Detectors: Giger-Muller counters, Bainbridge Mass Spectrograph and Auston Mass Spectrograph.

Unit-IV: Laser & Fibre Optics

Stimulated and Spontaneous Emission, Einstein's A&B Coefficients, Population Inversion, Pumping, Techniques of Pumping, Optical Resonator, Properties and Applications of Laser, Ruby, Nd:YAG, He-Ne lasers.

Introduction to Optical fibre, Acceptance angle and cone, Numerical Aperture, V- Number, Ray theory of propagation through optical fibre, Pulse dispersion , applications of optical fibre.

Unit-V: Wave Optics

Introduction to Interference, Fresnel's Bi-prism, Interference in Thin films, Newton's rings experiment, Michelson's interferometer and its application, Introduction to Diffraction and its Types, Diffraction at single slit, double slit, resolving power, Rayleigh criterion, Resolving power of grating, Concept of polarized light, Double refraction, quarter and half wave plate, circularly & elliptically polarized light.

References:

1. *Engineering Physics by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi.*
2. *Engineering Physics by Navneet Gupta, Dhanpat Rai Publication, New Delhi.*
3. *Engineering Physics by H. J. Sawant, Technical Publications, Pune, Maharastra.*
4. *Engg Physics by M.N. Avdhanulu & P.G. Kshirsagar, S.Chand & Co.Edition (2010).*
5. *Fundamentals of Physics by Halliday, Wiley, India.*
6. *Concepts of Modern Physics by Beiser, TMH, New Delhi*
7. *Solid State Physics by Kittel,Wiley India.*
8. *Atomic and Nuclear physics by Brijlal and Subraminiyan*
9. *LASERSs and Electro Optics by Christopher C. Davis, Cambridge Univ. Press (1996).*

10. *Optroelectronics an Introduction by J. Wilson & J.F.B.Hawkes, "" Prentice-Hall II Edition.*
11. *LASER theory and applications by A. K. Ghatak & Tyagarajan, TMH (1984).*

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC102		FUNDAMENTALS OF ELECTRONIC ENGINEERING	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

The subject aims to provide the student with:

1. An understanding of basic Electronics Engineering abstractions on which analysis and design of electronic circuits and systems are based, basic devices(analog and digital) and instrumentation abstractions.
2. The capability to use abstractions to analyze and design simple electronic circuits.
3. The ability to formulate and solve the different logic circuits and Boolean equations.
4. An understanding of how devices such as semiconductor diodes, rectifiers, and bi-polar junction transistors are working and how they are used in the design of useful circuits.

Course Outcomes:

At the end of the course students will:

1. Learn how to develop and employ circuit models for elementary electronic components, e.g., resistors, sources, inductors, capacitors, diodes and transistors
2. Become adept at using various methods of circuit analysis, including simplified methods such as series-parallel reductions, voltage and current dividers, etc.
3. Develop the capability to analyze and design simple circuits containing non-linear elements such as transistors using the concepts of load lines, operating points and incremental analysis
4. Learn how the primitives of Boolean algebra are used to describe the processing of binary circuits and to use electronic components as building blocks in electronically implementing binary functions;

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SEMESTER I

Syllabus

Unit-I

Evolution and Impact of Electronics in industries and in society, Familiarization of Resistors, Capacitors, Inductors, Transformers and Electro mechanical components, PN Junction diode: Structure, Principle of operation, Photo diode, LED, Solar cell.

Unit-II

Rectifiers and power supplies: Half wave and full wave rectifier, capacitor filter, Zener voltage regulator, Bipolar Junction Transistors: Structure, Principle of operation, characteristics Amplifiers.

Unit-III

Basic Instruments, electrical measurement – measurement of voltage , current , power & energy, volt-meters & ammeter , wattmeter , energy meter , , electronics instrument – multi-meter, CRO(analog & digital),An overview of voltage regulator.

Unit-IV

Number System: Introduction to binary, octal, decimal & hexadecimal systems, representation of nega-tive numbers, 1's, 2's, 9's, 10's complement and their arithmetic. Introduction, Definitions, Principle of Duality, Basic Theorems, Applications of Boolean Algebra, Boolean Functions, Complement of Boo-lean Function. Logic Gates (Symbol, Truth Table, Logic Diagram): And, OR, NOT, NAND, NOR, XOR, XNOR. Universal Gates: NAND Gate and NOR Gate implementation.

Unit-V

SIGNALS: Introduction, Representation of Discrete-time Signals: Graphical Representation, Function-

al Representation, Tabular Representation, Sequence Representation. Elementary Signals: Unit Step Function, Unit Ramp Function, Unit Parabolic Function, Unit Impulse Function, Sinusoidal Signal, Real Exponential Signal, Complex Exponential Signal, Rectangular Pulse Function, Triangular Pulse Function,

References:

1. *Bell, D. A., Electronic Devices and Circuits, Oxford University Press*
2. *Boylested, R. L. and Nashelsky, L., Electronic Devices and Circuit Theory, Pearson Education*
3. *Digital Design M. Morris Mano and Michael D. Ciletti, Pearson Education*
4. *A Anand Kumar, Signals and Systems, PHI.*

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5. *Vijay Baru, Rajendra Kaduskar, Sunil T. Gaikwad, Basics of Electronics Engineering, Wiley India Pvt. Ltd*

List of Experiments:

1. Familiarization with Laboratory Instruments (Oscilloscope, Function Generator, Digital Multimeter, DC Power Supply)
2. Characterization of Passive Circuit Elements (R, L, C)
3. Time & Frequency Response of RC and RL Circuits
4. V-I curve for P-N Junction Diodes.
5. V-I curve for Zener Diode.
6. Zener as a voltage regulator.
7. Half-Wave and Full-Wave(Center tapped and Bridge) Rectifiers.
8. Bipolar Junction Transistor (BJT) Circuits (Inverter, Common Emitter Amplifier).
9. Conversion of number system.
10. Basic Combinatorial Circuits.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME101		ENGINEERING DRAWING	60	20	20	30	20	3	-	4	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:-

1. To familiarize with concepts of scale, conic, sections and engineering curves.
2. To familiarize with the concepts related to the projections of points and line in all quadrants; construction of geometrical figures & solids, with its orientation on horizontal and vertical planes, and its projection; section of solid, development of solid and its isometric projection view.

Course Outcomes:-

Student would be able to draw scale, conic sections and engineering curves.

1. Student would be able to draw projection of point and line; identify the use of these concepts in practical life.
2. Students would be able to understand plain &3D model at various orientations and draw their projection.
3. Student would be able to draw the projections of with and without sectioning of solid models and surface development.
4. Students would be able to understand the difference between orthographic view and isometric projections.

Syllabus

Unit-I: Scales, Conic Section & Engineering Curves Scales

Representative Factor, types of scales, principle and construction of different scales, Conic Section: Construction of ellipse, parabola and hyperbola by different methods; Normal and

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Tangent. Engineering Curves: Cycloid, Epicycloids, Hyper cycloid, Involutes, rchimedean and Logarithmic spirals.

Unit-II: Projection of Points & Line Projection:

Introduction to projection, Types of projection, terminology, first angle and third angle Projection of Points Introduction of point, conventional representation, Projection of Lines: Introduction of straight line, orientation of straight line, true inclination and true length, concepts of end projectors, plan and traces and auxiliary planes.

Unit-III: Projection of Planes & Solids

Projection of Planes: Introduction of planes, types of planes, orientation of planes, projection of planes in different positions, traces of planes

Projection of Solids: Introduction of solids, classification of solids, recommended naming of corners of solids, orientation of solids

Unit-IV: Sections of Solids &Development of Surfaces

Sections Of Solids - Introduction of section of solids, terminology, types of section planes, section of prisms, section of pyramid and section of composite solids.

Development of Surfaces: Introduction of development of surfaces, classification of surfaces, methods of development, development of prisms, pyramids, cylinder and cone, anti-development

Unit-V : Isometric Projections

Isometric Projections: Introduction of isometric projection, terminology Isometric projections and isometric views, isometric views of planes, right solids, truncate solids and composite solids.

Textbooks:

1. *Engineering Drawing by N.D. Bhatt.*
2. *Engineering Drawing by C. Agarwal & Basant Agarwal.*
3. *Engineering Drawing by P. S Gill*

Reference Books:

1. *Engineering Drawing by Leonel Zurbito*
2. *Engineering Drawing by Nor Azlan Ramli.*
3. *Engineering Drawing by Ninad.*

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SEMESTER I

List of Experiments:

1. Drawing various types of scales using representative fraction.
2. Drawing various conics section.
3. Drawing various engineering curves like Cycloid, Epicycloids, Hyper cycloid, Involutes, Archimedean and Logarithmic spirals.
4. Projection of points in all quadrants.
5. Projection of straight lines in all quadrants in various orientations.
6. Projection of geometrical planes with various orientations.
7. Projection of solid models with various orientations.
8. Projection of section of solids by using various types of cutting planes.
9. Drawing development of surface using various methods of prisms, pyramids, cone, cylinder, etc.
10. Drawing anti- development of surfaces.
11. Drawing isometric projections using various methods and isometric views

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT101		INTRODUCTION TO INFORMATION TECHNOLOGY	60	20	20	-	50	3	-	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:-

1. Understand fundamentals of Information Technology.
2. Understand the social impact of Information Technology.

Course Outcomes:-

At the end of this course students will be able:

1. To understand the basics of Computer Network and its working.
2. To understand the basics of DBMS and its use in real world.
3. To understand the basics and working of devices and software's in the computer.
4. Know the use of Internet Services like E-mail, Telnet, FTP, WWW, HTML, and URL.
5. To understand the basic concepts of Cloud Computing.
6. To understand social impact of IT services in Real World.

Syllabus:

Unit- I:

Data and Information: Introduction, Type of data, Simple model of computer. Data processing using a computer: Introduction to Operating System, Data storage Media, High capacity network storage media. Introduction to Database Management System; Database modelling; Relational model; Distributed DBMS; Data warehouse, Data mining; Classification of Language and Applications.

IT Application in Communication: Network services-telephone services, Cellular telephone services, Radio and TV broadcasting, Audio-Visual conferencing, Video-on-demand. Internet

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Technology Introduction, Working of internet, Introduction to network protocol and topologies. Types of network: LAN, WAN, Web browser. Internet Services: E-mail, Telnet, FTP, WWW, HTML, URL

Unit II

Principles of Programming Languages: Preliminary Concepts, Reason for studying, concept of programming languages, Programming Domain, Language categories, Programming Paradigms: Imperative, Objected Oriented, Functional & Logic Programming, Programming Language Implementation: Compilation, Virtual Machine, Programming Environment.

Data Types: Introduction, Primitives, character, user defined, array, associative, record, union, pointer reference type. Variables, constants, Expression & Statements, Subprogram & Blocks, Abstract Data types.

Unit- III

IT Application in Multimedia: Introduction, Components of multimedia and challenges, Video compression, Video coding technology: JPEG, MPEG, And JBIG. Introduction to cloud computing: Types, Services, Models, Characteristics, Benefits and Challenges, Application, Limitations.

Unit -IV

IT Application in E-Commerce and E-Governance: Introduction, Different Types of E-Commerce with examples, Advantages and disadvantages, E-Commerce in India, E-Services, E-Commerce security, Internet security and ethics, Technology issues, Social issues, Introduction to E-Governance, Challenges, Application, advantages, Case study of MP-online and IRCTC.

Unit -V

Social impact of information technology: Introduction, Social Uses of World Wide Web, Social networking Services, Privacy, security and integrity of Information ,Disaster recovery Intellectual property rights, IT Enabled Services and careers, Career in information technology, Case study of NPTEL.

References:

1. *V.Rajaraman, Introduction to Information Technology; PHI*
2. *E Balagurusamy, Fundamentals of Computers, TMH*
3. *Santiram Kal Basic Electronics, PHI*
4. *M.N. Rao Cloud Computing, PHI*

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTHU101		COMMUNICATION SKILLS-I	-	-	-	-	50	-	-	2	1

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:-

1. To develop, enhance and demonstrate LSRW Skills.
2. To enable students to acquire oral presentation skills
3. To prepare students to become more confident and active participants in all aspects of their undergraduate programs.

Course Outcomes:-

1. The students will be able to enhance confidence in their ability to read, comprehend, organize, and retain written information.
2. The students will be able to improve upon their language skills, oral communication skills, group discussion, personal development and confidence level.
3. The students will be able to bridge the language gap vital to their success.
4. The students will be able to communicate effectively.

Syllabus

Unit I : Listening Skills

Listening: Process, Types of Listening: Active, Passive, Pseudo, Evaluative, Difference between listening and hearing. Listening Comprehension exercises.

Unit II :Speaking Skills

Extempore, Debates, Oral Presentation, Just a Minute.

Unit III :Linguistics and Phonetics

Consonants and vowel symbols, CV structure, Place and Manner of articulation.

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Unit IV: Developing Reading Skills

Reading Comprehension, Process, Active & Passive Reading, Reading Speed Strategies, Benefits of effective reading, Reading comprehension of Technical material and SQ3R reading technique.

Unit V: Vocabulary Building

Synonyms, antonyms, idioms and proverbs.

References

1. *Sharma.(). Business Correspondence and Report Writing.; TMH.*
2. *W.S. Allen, Living. English Structure. Longmans.*
3. *Ehrlich .English Grammar. Schaum Series; TMH.*
4. *R.K. Bansal and IB Harrison. Spoken English . Orient*
5. *Joans and Alexander. New International Business English .Longman.; OUP.*
6. *Ashraf Rizvi.(2005).Effective Technical Communication. New Delhi:Tata Mc Graw Hill*
7. *A.J. Thomson and A.V. Martinet.(1991) A Practical English Grammar(4th ed). Newyork: Ox-ford IBH Pub.*

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT107		PROGRAMMING SKILLS-I (C & C++)	-	-	-	30	20	-	-	4	2

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:-

1. To understand the concepts of programming languages (object oriented programming and its implementation).
2. To understand the concept of program design, program coding, debugging, testing for development.
3. To describe the concepts of loops, arrays.
4. To understand the concepts of memory, pointers, functions, variables.
5. To understand the concepts of class, constructor, destructor.

Course Outcomes:-

1. Student will able to explain and implement the object oriented programming concepts.
2. Student will design, develop & test program for development.
3. Student will able to apply loop concept in program and design an array program.
4. Student will able to apply & implement the concept of class, constructor & destructor.

Syllabus

Unit-I

Introduction ,History Types of languages Structured Language Object oriented programming OOPS terminology and features, Algorithms Definition, needs and characteristics Flow Charts Rules, Advantages and implementation Concepts of loping and counting.

Unit-II

Program Development Program identification Analysis Program design Coding Debugging Testing Documentation Maintenance Characteristics of a Good program Data Types: Primary

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data types Tokens Variables and literals Keywords and operators C++ Data Types Operators and Expressions Types of operators Precedence of operators.

Unit- III

Decision Making, Branching and Looping Branching if, if- else, if-else-if statement switch Statement Conditional operator goto statement Looping while, do- while, for statements Nesting of loops, jumping in loops. Arrays :One dimensional array Two dimensional arrays, Multidimensional arrays

Unit- IV

Pointers, Introduction Dynamic and Static allocation of memory Pointer variable Pointer and arrays Arrays of pointers Dynamic memory allocation operators this pointer, User defined functions, Functions, arguments and return values Recursion of functions Variables in functions Automatic, External, Static and register variables

UNIT-V

Structures and Unions, Definition of class and object OOPs properties Member variable and member functions Friend functions Class member access- private, public and protected Array of class objects Structured union, nested class, Constructors and Destructors, Polymorphism, Inheritance and file handling.

References :

1. *Fundamentals of Computers : E Balagurusamy, TMH*
2. *Basic Computer Engineering: Silakari and Shukla, Wiley India*
3. *Fundamentals of Computers : V Rajaraman, PHI*
4. *Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.*

List of Experiments:

1. Introduction to different generations of languages (Structured Language Object oriented programming), OOPS terminology and features.
2. Study of procedural programming paradigm and object-oriented programming paradigm.
3. To demonstrate use of data types, simple operators (expressions).
4. To demonstrate decision making statements (switch case) decision making statements (if and if-else, nested structures).
5. To demonstrate use of simple loops and nested loops.
6. To demonstrate menu driven programs and use of standard library functions.
7. To demonstrate writing C programs in modular way (use of user defined functions
8. To demonstrate recursive functions.

9. To demonstrate use of 1D array and multidimensional array(2-d arrays).
10. To demonstrate use of pointers and concept of strings (strings and pointers).
11. . Write a program to illustrate functions.
12. [Classes and Objects] Write a program that uses a class where the member functions are defined inside a class.
13. [Classes and Objects] Write a program to demonstrate the use of static data members.
14. [Constructors and Destructors] Write a program to demonstrate the use of zero argument and parameterized constructors.
15. [Constructors and Destructors] Write a program to demonstrate the use of dynamic constructor.
16. [Constructors and Destructors] Write a program to demonstrate the use of explicit constructor.
17. [Operator Overloading] Write a program to demonstrate the overloading of increment and decrement operators.
18. [Operator Overloading] Write a program to demonstrate the overloading of binary arithmetic operators.
19. [Typecasting] Write a program to demonstrate the typecasting of basic type to class type.
20. [Typecasting] Write a program to demonstrate the typecasting of class type to basic type.
21. [Inheritance] Write a program to demonstrate the multilevel inheritance.
22. [Inheritance] Write a program to demonstrate the multiple inheritances.
23. [Inheritance] Write a program to demonstrate the virtual derivation of a class.
24. [Polymorphism] Write a program to demonstrate the runtime polymorphism.
25. [Exception Handling] Write a program to demonstrate the exception handling.
26. [File Handling] Write a program to demonstrate the reading and writing of objects.