



PRESTIGE

INSTITUTE OF MANAGEMENT, GWALIOR
UGC NAAC ACCREDITED 'A' GRADE INSTITUTE
UGC APPROVED AUTONOMOUS INSTITUTE

DETAILED SYLLABUS & SCHEME OF EXAMINATION

for

Bachelor of Computer Applications (BCA)

Three Years Degree Course
(w.e.f. Batch 2019 – 2022)

Department of Computer Applications



Semester – I

Paper Code	Paper Name	Theory		Sessional		Practical		Total
		Max	Min	Max	Min	Max	Min	
BCA101	Calculus	80	32	20	12	-	-	100
BCA102	Information Technology	80	32	20	12	-	-	100
BCA103	Internet & E - commerce	80	32	20	12	-	-	100
BCA104	Problem solving using 'C'	80	32	20	12	-	-	100
BCA105	PC Packages	80	32	20	12	50	25	150
BCA106	Practical in 'C'	-	-	20	12	80	40	100
	Total	400		120		130		650

Semester – II

Paper Code	Paper Name	Theory		Sessional		Practical		Total
		Max	Min	Max	Min	Max	Min	
BCA201	Advance Calculus	80	32	20	12	-	-	100
BCA202	Computer Organization	80	32	20	12	-	-	100
BCA203	Communicative English Grammar	80	32	20	12	-	-	100
BCA204	Object Oriented Programming in C++	80	32	20	12	-	-	100
BCA205	DBMS	80	32	20	12	50	25	150
BCA206	Practical in c++	-	-	20	12	80	40	100
	Total	400		120		130		650

Semester – III

Paper Code	Paper Name	Theory		Sessional		Practical		Total
		Max	Min	Max	Min	Max	Min	
BCA301	Discrete Mathematics	80	32	20	12	-	-	100
BCA302	Visual Basic.Net	80	32	20	12	-	-	100
BCA303	Introduction to Operating System	80	32	20	12	-	-	100
BCA304	Communication Techniques	80	32	20	12	-	-	100
BCA305	Computer Graphics & Multimedia	80	32	20	12	50	25	150
BCA306	Practical in Visual Basic.Net	-	-	20	12	80	40	100
	Total	400		120		130		650

Semester – IV

Paper Code	Paper Name	Theory		Sessional		Practical		Total
		Max	Min	Max	Min	Max	Min	
BCA401	Numerical Methods	80	32	20	12	-	-	100
BCA402	Advanced Computer Architecture	80	32	20	12	-	-	100
BCA403	Data Structure using c++	80	32	20	12	50	25	100
BCA404	Accounting & Management Control	80	32	20	12	-	-	100
BCA405	Programming in Java	80	32	20	12	-	-	150
BCA406	Practical in Java	-	-	20	12	80	40	100

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Dr. P. Singh

Dr. P. Singh



Total	400	120	130	650
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Semester – V

Paper Code	Paper Name	Theory		Sessional		Practical		Total
		Max	Min	Max	Min	Max	Min	
BCA501	Differential Equations	80	32	20	12	-		100
BCA502	Software Engineering	80	32	20	12	-		100
BCA503	Artificial Intelligence and Expert Systems	80	32	20	12			100
BCA504	Programming in Advance Java	80	32	20	12	-		100
BCA505	Oracle 8i	80	32	20	12	50	25	150
BCA506	Practical in Advance Java	-		20	12	80	40	100
	Total	400		120		130		650

Semester – VI

Paper Code	Paper Name	Theory		Sessional		Practical		Total
		Max	Min	Max	Min	Max	Min	
BCA601	Probability & Statistics	80	32	20	12	-		100
BCA602	Networking Concepts	80	32	20	12	-		100
BCA603	Introduction to Asp.net & C#	80	32	20	12			100
BCA604	Software Testing	80	32	20	12	-		100
BCA605	Mobile Application Development	80	32	20	12	50	25	150
BCA606	Project in Asp.net & C#	-		20	12	80	40	100
	Total	400		120		130		650

Note: Examination scheme will be as per Ordinance No. 60 of Jiwaji University Gwalior.

Peripath *ML* *5.2* *7* *Pranav* *SS* *DE* *LP* *B*

PAPER CODE BCA - 101

Calculus

Course Objective

The objective of this course is to familiarize the students with core concepts of calculus.

Learning Outcomes

1. Understand the concept of limits, continuity and differentiability of a function.
2. Analyze and evaluate rate of change at different points of given interval using different theorems.
3. Understand the concept of tangents, Normals, curvature of a function and tracing of curves.
4. Understand the integration of different types of functions.
5. Understand the application of integrals to determine Quadrature, Rectification, Volumes and surfaces.

Course Contents

UNIT-I

Review of concepts of function of one variable: Definition of a function, Types of Functions. Limits: definition, working rule for finding out the limit, fundamental properties of limits, problems based on limits. Continuity: Definition, Points of Discontinuity, Classification of Discontinuity, Problems based on Continuity & Discontinuity. Differentiability: Condition for Differentiability and problems.

UNIT-II

Rolle's theorem, First and Second Mean value theorems, Taylor's theorem, Successive differentiation, Leibnitz Theorem, Taylor's & Maclaurin's series, Intermediate forms.

UNIT-III

Tangents, Normals, Curvature, Tests for Concavity and Convexity, Points of Inflexion, Multiple Points, Tracing of Curves in Cartesian and polar co-ordinates.

UNIT-IV

Integration of rational and irrational algebraic functions and transcendental functions, reduction formulae.

UNIT-V

Definite Integrals, Quadrature, Rectification, Volumes and surfaces of solids of revolution.

Suggested Readings:

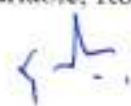
Main Text Books

1. Calculus-I by Dr. D.C. Agrawal, Shree Sai Prakashan, Meerut
2. Differential Calculus by Dr. Gorakh Prasad, Pothishala Pvt. Ltd.

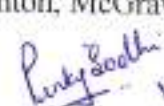
Reference Books

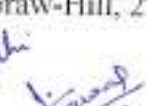
1. Calculus with Early Transcendental Functions by James Stewart, Cengage Learning, 7th ed.
2. Calculus – Single and Multivariable by Hughes – Hallett, John-Wiley and Sons, 6th ed.
3. Calculus-Single variable, Robert T. Smith & Roland B. Minton, McGraw-Hill, 2nd ed.



















PAPER CODE BCA - 102
Information Technology

Course Objective

This course will enable the student to gain an understanding of the core concepts and technologies which constitute Information Technology.

Learning Outcomes

Able to articulate and demonstrate a basic understanding of the fundamental concepts of Information Technology

Course Contents

UNIT-I

Computer System Concept, Computer System Characteristics, **Types of Computers**- Analog, Digital, Hybrid, General Purpose, Special Purpose Computers, Micro, Mini, Mainframe, Super Computers. A Simple model of a computer. **Data Storage**: Introduction, Memory Cell, Physical Devices used as Memory Cells, Random access Memory, Read only Memory, Secondary Memory, Floppy Disk Drive, Compact Disk Read only Memory (CDROM), Archival Memory. **Central Processing Unit**: Introduction, The Structure of a Central Processing Unit, Specification of a CPU, Interconnection of CPU with Memory and I/O Units, Embedded Processors.

UNIT-II

Data Processing Using a Computer. Data representation and codes, Decimal, Binary, Octal and Hexadecimal system and inter conversion, ASCII Codes and BCD numbers. **Input Devices**: Keyboard, Mouse, Trackball, Joystick, Scanners, OMR, BCR, OCR, MICR, Digital Camera, Voice Recognition, Light Pen, Touch Screen. **Output Devices**: Introduction, Printers, Audio Output, Monitors - Characteristics and types of monitors.

UNIT-III

Computer Software: Introduction, Operating Systems - Functions, Types, Programming Languages, a classification of Programming Languages, Interpreters, Compilers, Application Software – Word Processing, Spreadsheet, Presentation Graphics, and Database Management System.

UNIT-IV

Computer Networks: Introduction, Local Area Network (LAN), Applications of LAN, Wide Area Network (WAN), Internet, Naming Computers Connected to Internet, The Future of Internet Technology. **Some Internet Applications**: Introduction, E-mail, Information Browsing Service, The World Wide Web, Information Retrieval from the World Wide Web, Other Facilities Provided by Browsers. Privacy, Security and Integrity of Information.

UNIT-V

What is - Desktop, Cluster, Grid and Cloud computing, why cloud computing, Challenges and opportunities, Three basic services of Cloud Computing – SAAS, PAAS, IAAS. Concept of Big Data, Difference between Big Data and Small Data. 3V characteristics – Volume, Variety, Velocity. Different types of Big Data – Structured, semi structured and unstructured Big Data. What is Hadoop?



Suggested Readings:

Main Text Books

1. Foundations of Computing by P.K. Sinha and P. Sinha, BPB Publication, 3rd edition.
2. Introduction of Information Technology by V. Rajaraman, PHI Learning Private Limited.

Reference Books

1. Computers by Larry long & Nancy long, Prentice Hall, 12th edition.
2. Computer Fundamentals by B. Ram, Wiley 3rd edition.

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PAPER CODE BCA - 103

Internet & E-Commerce

Course Objective

The objective of this course to provide the basic knowledge of Internet, E-mail, Protocol and search engine. To introduce the basic concept of Electronic Commerce and its use for general mass.

Learning Outcomes

1. To understand basic concept of Internet and its services.
2. To compare various ISP and its services.
3. To create E-mail account and perform different operations.
4. To understand different protocols use for Internet.
5. To understand how to work on browser and perform searching on search engines.
6. To identify and describe unique features of e-commerce technology and discuss their business significance.
7. Understanding the importance of security, privacy and ethical issues related to E-Commerce.

Course Contents

UNIT-I

Introduction of Internet & E- Commerce: Internet & Its services , H/S & S/W requirements to connect to the internet, Introduction of WWW, Web Server and Web Client, Difference between the web and the internet, Internet Service Provider (ISP), Web publishing concepts, Domain name registration, space on host server for website. Portals – Steps to build homepage. Metadata; Advantages of Portal; Enterprise Information Portal (EIP).

UNIT-II

Choosing an Internet service Provider: Stability, Customer service, Performance, Pricing. Establishing an Internet account. E- Mail Basics: Running an E - Mail program, Sending mail, Reading mail, Replying to mail, Deleting mails, Newsgroups, mailing Lists, Chatting, Protocols for E-Mail.

UNIT-III

Data Transmission Protocols, client/Server Architecture & its Characteristics, FTP & its usage, Telnet Concept, Remote Logging, Protocols, Terminal Emulation. Message board, Internet chatting - Voice chat, text chat. Wireless Applications Protocols.

UNIT-IV

An Introduction to Internet Explorer: Starting Internet Explorer, A quick tour with Internet Explorer, At the Helm in internet explorer, viewing various file types. Internet search Engine: What is search Engine, How do search Engines work, Types of search Engines.

UNIT-V

Brief history of e-com, Elements of e- com, Types, Intermediaries, and E- commerce, Advantages and Disadvantages of e-com, E-commerce practices Vs traditional business practices. E-Business: E-Business Vs E-Commerce, EDI- Who use EDI, Origin, Benefits, Migration to open EDI-Approach, E-com with WWW/Internet, Main Components of E-Commerce; Functions of Electronic Commerce – Communication, Process Management, Service Management, Transaction Capabilities. Electronic Communication & WWW: PC & networking, network topology and communication media, E-mail, OSI and

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TCP/IP models, LAN, WAN, MAN, internetworking - Bridges and gateways, What is WWW, Web Architecture, The Web and E- com. Electronic Payment System: Overview, Electronic or digital cash, Electronic checks - Benefits, Online credit based system, Debit card, smart Cards, Network and Website Security - Transaction security and data protection, Security audits and penetration testing; E-Business Risk Management Issues: Firewall - Network policy, Advanced authentication mechanism, Packet filtering, Application gateways; Defining Enterprise Wide Security Framework.

Suggested Readings:

Main Text Books

1. Internet Complete, SYBEX - BPB publication.
2. Web Commerce Technologies Handbook" By Daniel Minoli & Emma Minoli, Mc Graw Hill.
3. E- Commerce by Dr. Varinder Bhatia, Khanna Publ., New Delhi.
4. Internet & web page designing, V.K. Jain, BPB Publication.

Reference Reading

1. The Internet Book- Douglas Comer, Prentice Hall Publisher.
2. Internet for everyone- Alexis Leon and Mathews Leon, Tech World Publisher.
3. Electronic Commerce (A Manager's Guide) by Ravi Kolkata & Andrew B. Whinston, Addison-Wesley Professional.

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PAPER CODE BCA - 104
Problem Solving Using 'C'

Course Objective

The course is designed to initiate the students into the discipline of Programming. It aims to start off the development of problem solving ability using computer programming. This course teaches not only the mechanics of programming, but also how to create programs that are easy to read, maintain, and debug. Students are introduced to the design principles for writing good programs. Also by learning the basic programming constructs they can easily switch over to any other language in future.

Learning Outcomes

After the completion of this course, the students will develop their ability to design, develop, test and document structured programs in C language.

Course Contents

UNIT I

Programming fundamentals: program concept, algorithms, flow charts - symbols, rules for making flow chart, types of flowchart, advantage & disadvantage, techniques of problem solving: programming techniques – top down, bottom up, modular, structured - features, merits & demerits, programming logic- simple, branching, looping. Testing & debugging & their tools.

UNIT II

Programming in c including features of 'c', c tokens, variables, identifiers, keywords, data types, constants, operator and expression, operators: arithmetic, logical, relational, conditional and bit wise operators, precedence and associativity of operators, type conversion in expression, basic input/output and library functions single character input/output i.e. getch(), getchar(). Getche(), putchar(),formatted input output i.e. printf() and scanf().

UNIT III

Branching constructs: If statement, if.....else statement, nesting of if....else statement, else if ladder, the ?: operator, switch statement, compound statement, loop controls: for, while, do-while loops, break, continue, goto statement, arrays : what is array, declaring initializing 1d, 2d and 3d array. String: declaration, string functions – strcat, strcpy, strcmp, strlen, strstr.

UNIT IV

Functions: categories of functions user defined and library function, recursion, function arguments, return values and nesting of function, calling of functions, scope and life of variables - local and global variable, storage classes - auto, extern, static, pointers: operations on pointers, operators for pointers, pointers and function, array of pointers, pointer and strings.

UNIT V

Preprocessor directives: #define, defining functions like macros, include, conditional compilation directives. Structures: the concept of structure, initializing a structure, the structure tag, dot operator, array of structure, structure and pointer, arrow operator and nesting of structure. Unions: initialization and use of it in a program. Command line arguments.

Suggested Readings:

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Main Text Books

1. Let us C by Yashwant Kanitkar, BPB Publicatiuon
2. C Programming by Schaum's series
3. Programming in ANSI C by Balgurusuamy, Tata McGraw Hill

Reference Books

1. The sprit of C by Mulish Cooper, Jaico Publ.

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PAPER CODE BCA - 105

PC Packages

Course Objective

The course objective is to enhance in-depth understanding of why computers are essential components in business, education and society. Students will be able to use Windows on the PC-compatible computers as well as MS Office.

Learning Outcomes

1. Upon completion of this course, the student will be able to apply technical knowledge and perform specific technical skills, including:
2. Solve common business problems using appropriate Information Technology applications and systems.
3. Identify categories of programs, system software and applications. Organize and work with files and folders.
4. Navigate in word processors and use menus and commands, 'hands-on' knowledge of MS-Excel, MS-Power point, MS-Access etc.
5. Students can become proficient in creating documents and presentations with Office.

Course Contents

UNIT – I

MS Windows: Introduction to MS Windows, features of Windows, various versions of Windows & its use, working with Windows: My computer & Recycle Bin, Desktop, Icons and Windows Explorer. Screen Description & working styles of Windows, Dialog Boxes & Toolbars, working with Files & Folders, Shortcuts & Autostarts, Accessories and Windows settings using Control Panel, Start Button & Program Lists, Installing new Hardware & Software.

UNIT – II

Basics of Word: creating Word documents, The Word window, entering text, editing Document text: text, copying and moving text. Applying text enhancements: applying Fonts and Font styles in Word, highlighting Text for distinctive look. Aligning and Formatting: aligning Text, using Indentation options, setting Line Spacing options, using Tabs. Creating Lists, Numbers and Symbols: Numbering and Bullets, creating Special Characters. Replacing and checking Text: creating and applying frequently used Text, finding and replacing Text, more about Spelling and Grammar, using the Thesaurus command. Getting into Print: using Print Preview, changing Page Orientation and Paper Size, aligning Text vertically, setting Margins, Printing options.

Advanced Formatting Techniques in Word: Formatting Pages, formatting Sections, creating and modifying Page Numbers, creating Headers and Footers, Taking care of Loose Ends. Working with Columns: working with Newspaper Columns, revising Column Structure. Constructing High-Quality Tables: creating and revising Tables, modifying Table Structure, formatting Tables, using Tables Calculatingly. Working Smarter with Word: using Templates. Creating Outlines in Word: creating an Outline, modifying an Outline.

UNIT- III

ACCESS Concepts & Terms: Database Tables, Relational Databases, Records, Fields, Controls & Objects, Queries & Dynasets, Forms, Reports, Properties, Wizards, Macros, Access Requirements, Starting & Quitting Access, The Access Workspace & Tool, Views, Creating Database & Tables with & without Wizard, Field Name, Data Types & Properties, Adding & deleting Fields, Renaming Fields & their Caption, Resizing Fields, Freezing

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Columns, Primary Key Field & Indexing Fields. **Form:** Form Wizard, Saving & Modifying Forms, Entering & Editing Data, Finding, Sorting & Displaying Data, Queries & Dynasets, Creating & using Select Queries, using Wild Cards in Queries, Reformatting Dynasets. **Reports:** Creating Reports, Previewing Reports, Printing Reports, Modifying, Saving. **Relational Databases** – Definition, Purpose, Creation, Viewing, Deleting, Expressions, Macros.

UNIT - IV

Creating Excel Worksheets : Entering and Editing Cell Entries, The excel Application Window, Workbooks and Worksheets, Moving the Cell Pointer, Entering Text and Numbers, Revising Text and Numbers, Working with Numbers: Creating Formulas, Data Validations, Formatting numbers. Changing Worksheet Layout: Moving and Copying Cell Contents, Naming a Worksheets, Selecting Worksheets, Copying and Moving Worksheets, Inserting and Deleting Worksheets, Other Formatting Options: Conditional Formatting, Aligning Text, Border and Color, Printing in Excel: Print Preview, Changing Page Setup, Checking Worksheet Spelling.

Advanced Techniques in Excel:

Using Functions and References; Using Functions, Entering Functions, Various types of excel Functions, Relative and Absolute Cell References, Naming Ranges: Naming Ranges, Using Names, Pivot table, Creating Easy-to-Understand Charts: Pie Charts, Series Charts, Creating Charts, Moving, Sizing, and Printing Chart Objects, Editing and Formatting Charts: Adding a Data Series, Deleting a Data Series, Modifying and Formatting Charts.

UNIT - V

Creating PowerPoint Presentations: Creating a Basic Presentation, Building Presentations, Modifying Visual Elements, Formatting and Checking Text, Adding Objects, Applying Transitions, Animation Effects and Linking, Preparing handouts, Connecting slides through hyperlink and action button, Taking the Show on the Road.

Suggested Readings:

Main Text Books

1. Easy Office 2013, Book by Patrice-Anne Rutledge, Pearson education
2. Microsoft Office 97: Will Train, Gini Courter, Annette Marquis BPB Publication.

Reference Books

1. Microsoft Office Professional 2013 Step by Step Book by Andrew Couch, Beth Melton, Echo Swinford, and Mark Dodge, Microsoft publications

PAPER CODE BCA - 201
Advanced Calculus

Teaching Objective

The objective of this course is to help student gain knowledge about advanced Calculus.

Learning Outcomes

1. Understand the concept of the Partial derivative of a function and its applications
2. Understand to apply Beta and Gamma function to simplify integration
3. Understand and apply integration to calculate the area, rectification and volume of different types of curve
4. Understand the concept of convergence of improper integrals

Course Contents

UNIT-I

Partial differentiation: Function of several variables, Limits, continuity and differentiability, Partial derivatives, Euler's Theorem, Mean value theorem & Taylor's theorem for functions of two variables.

UNIT-II

Envelopes, Evolutes, Maxima, Minima and saddle points of functions of two variables, Lagrange's multiplier method

UNIT-III

Gamma and Beta functions and their properties, some important deductions (duplication formula)

UNIT-IV

Multiple integrals: Integration of functions of two & three variables, Double & triple integrals, Change of order of Integration, Use of double and triple integrals in finding areas and volumes.

UNIT-V

Improper Integrals: Convergence of improper integrals, Evaluation of convergent improper integrals.

Suggested Readings:

Main Text Books

1. Calculus-I by Dr. D.C. Agrawal, Shree Sai Prakashan, Meerut
2. Differential Calculus by Dr. Gorakh Prasad, Pothishala Pvt. Ltd.

Reference Books

1. Calculus with Early Transcendental Functions by James Stewart, Cengage Learning, 7th ed.
2. Calculus – Single and Multivariable by Hughes – Hallett, John-Wiley and Sons, 6th ed.
3. Calculus-Single variable by Robert T. Smith & Roland B. Minton, McGraw-Hill, 2nd ed.
4. Calculus- Volume 1 One-variable Calculus, with an Introduction to Linear Algebra by Tom M. Apostol, Wiley Eastern, 2nd ed.

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PAPER CODE BCA - 202
Computer Organization

Course Objective

The goal of this subject to explain the theory and concept of computer organization. The subject is cover very important basic building block of digital circuit & their functionalities and application through students can design the circuit.

Learning Outcomes

1. Understand of Boolean Law & their functionality.
2. Use and understand the functionality of logic gates AND, NAND, OR, NOR, XOR, NXOR, NOT.
3. Learn to design and analyze a logic circuit and build using logic gates & Universal Gate.
4. Student develop knowledge for designing a logic circuit: truth table, Karnaugh map, Boolean algebra and logic functions, SOP (sum of products) and POS (product of sums), canonical algebraic equations, minterms and maxterms, Design concept map.
5. Simplify or minimize logic functions with up to fourth input variables by means of Karnaugh maps or Boolean Law.
6. Design Arithmetic circuit for arithmetic operation, Multiplexer & Encoder for binary to decimal or vice-versa.
7. Design Flip-Flop by using SR, D, T, JK & Master Slave for storing a bit.
8. Analysis Memory addressing & Design & Compare of RAM & ROM & their categories.
9. Design RAM & ROM chip for different size.

Course Contents

UNIT-I

Boolean algebra, Boolean equation of logic gates. Logic Gates: AND, OR, NOT GATES and their truth tables. NOR, NAND & XOR gates, Application of Logic Gates, Basic Boolean Law's, Demorgan's theorem, Boolean laws and theorems, Duality theorem, Application of Boolean Law.

UNIT-II

Karnaugh Map, Map Simplification, Minimization Techniques, Sum of Product (SOP) & Product of Sum (POS), Pairs, Quads, Octets, Do not Care Condition, Combinational and Sequential Circuits & their Applications, Combinational Circuits: Grey Code, Multiplexer, De-multiplexer, BCD to Decimal Decoder, Seven Segment Decoder, Encoder.

UNIT-III

Unsigned Binary Numbers, Negative Number representation: Sign Magnitude Numbers, 1's Compliment, 2's Compliment, Arithmetic Addition, Subtraction, Overflow, Arithmetic Circuit: Half Adder, Full Adder, Sub-tractor Circuits, Parallel Adder Subtractor.

UNIT-IV

Logic & Flip-flops: RS, D, JK, Master Slave, Shift registers, Types of shift registers, Asynchronous and Synchronous counters.

UNIT-V

Semiconductor Memories: Memory Addressing, ROM, PROMS, EPROMS, RAMS, DRAMS, SRAMS, Memory Cells, Design ROM & RAM Chip, A to D and D to A Converter.

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Suggested Readings:

Main Text Books

1. Digital Principles and applications - Malvino A.P. & Lecch, TMH
2. Digital Circuit and Design – S. Salivahanan & S. Arivazhagan, Vikas Publishing.

Reference Books

1. Digital Computer Organization - Morris Mano, Pearson Publ.

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- Bottom row: "Sb", "P", "P"
- Bottom center: "R"

PAPER CODE BCA - 203
Communicative English Grammar

Course Objective

To enable the students to learn General English Grammar and its use in daily life

Learning Outcomes

1. Students will enhance their awareness of correct usage of English grammar in writing and speaking.
2. Understand and use grammar terminology.
3. Compose short narrative paragraphs to describe daily activities
4. Use English Language effectively.

Course Contents

UNIT-I

Sentence- its kinds, subject and predicate. Parts of Speech- Noun, Pronoun, Adjective, Verb and Adverb in detail.

UNIT-II

Tenses- Present, Past and Future (Indefinite, Continuous, Perfect & Perfect Continuous) Conditional Sentences, Sequence of Tenses, Agreement of the verb with the subject, Active and Passive Voices, Direct and Indirect Narration.

UNIT-III

Uses of Infinitive, Participles and Gerund. Articles, Punctuation and Preposition, Word-building- forming Nouns from Verbs/ Adjectives and vice versa, Prefixes and Suffixes. Determiners one word substitutions, Prepositional phrases, Antonyms, Synonyms, Homonyms.

UNIT-IV

The Structure of Sentences- Clauses (subordinate and coordinate) and Phrases, Simple, Complex and Compound Sentences. Transformation of Sentences, Synthesis of Sentences.

UNIT-V

Translation- from Hindi to English & Vice Versa. Writing a paragraph in about 100- 150 words on current National/International Events, Renowned Political Leaders, Sports Personalities, Social workers, Thinkers, Scientists, Nobel Prize Winners etc.

Suggested Readings:

Main Text Books

1. A Practical English Grammar by A.J. Thomson & A.V. Martinet. OUP
2. A Remedial English Grammar for Foreign Students by F.T. Wood. Macmillan Publ.

Reference Books

1. Practical English Usage by Michael Swan. OUP, ELBS
2. High School English Grammar Composition by Wren & Martin. Revised by N.D.V Prasada Rao, S.Chand & Co.
3. Living English Structure by W.S. Allen

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PAPER CODE BCA - 204
Object Oriented Programming in C++

Course Objective

1. To strengthen the problem solving ability by applying the characteristics of an object-oriented approach.
2. Demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.
3. To introduce object oriented concepts in C++.

Learning Outcomes

1. Explain what constitutes an object-oriented approach to programming and identify potential benefits of Object-oriented programming over other approaches.
2. Analyze and decompose problem specifications from Object Oriented Perspectives
3. After completion of this course student will be able to develop console application using object oriented approach.

Course Contents

UNIT-I

Introduction, OOP languages, characteristics of OOP's languages, application of OOP's, OOP's paradigm, concepts, benefits of OOP's, disadvantage of OOP's, Application of OOP's., Classes & Objects: Specifying a Class, Creating Objects, Accessing Class members, Defining member function, Outside Member Functions as inline, Accessing Member Functions within the class, Static data member, Access Specifiers: Private, Protected and Public Members. Passing objects to function, Returning objects, Object assignment, This pointer.

UNIT-II

Constructor & Destructor: Introduction, Constructor, Parameterized constructor, Multiple constructor in a class, Constructor with default argument, Copy constructor, Default Argument, Destructor.

Array, Pointers, and references: Array of objects, Pointers to object, , Pointer to class members. References: Reference parameter, Passing references to objects, Returning reference, Independent reference, The Dynamic Allocation operators, Initializing allocated memory, Allocating Array, Allocating objects.

UNIT-III

Function & operator overloading : Function overloading, Overloading constructor function finding the address of an overloaded function, Operator Overloading: Creating a member operator function, Creating Prefix & Postfix forms of the increment & decrement operation, Overloading the shorthand operation (i.e. +=, -= etc), Operator overloading restrictions, Operator overloading using friend function, Overloading New & Delete, Overloading some special operators, Overloading [], (), -, comma operator, Overloading << and >> .

UNIT-IV

Inheritance: Base class Access control, Inheritance & protected members, Protected base class inheritance, Inheriting multiple base classes, Constructors, destructors & Inheritance, When constructor & destructor function are executed, Passing parameters to base class constructors, Granting access, Virtual base classes .

Virtual functions & Polymorphism: Virtual function, Pure Virtual functions, Early Vs. late binding

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UNIT-V

The C++ I/O system basics: C++ streams, The basic stream classes: C++ predefined streams, Formatted I/O: Formatting using the ios members, Using manipulators to format I/O, Creating your own manipulators, -File Management: Introduction – File handling, File structure, File handling function, File types, Streams, Text, Binary, File system basics, The file pointer, Opening a file, Closing a file, Reading and Writing File.

Suggested Readings:

Main Text Books

1. Object Oriented Programming With C++ by R. Subburaj, Vikas Publishing House, New Delhi.
2. C++ by E. Balguruswamy, TMH Publ.

Reference Books

1. C++ The complete reference by Herbert Schildt, TMH Publication.
2. The C++ Programming Language: Special Edition by Bjarne Stroustrup, Addison-Wesley

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PAPER CODE BCA - 205
DBMS

Teaching Objective

This course covers fundamentals of database architecture, database management systems, and database systems. Principles and methodologies of database design, and techniques for database application development.

Learning Outcomes

Upon completion of this course, participants will have gained knowledge of database system concepts and the ability to

1. Understand user requirements/views
2. Analyze existing and future data processing needs
3. Develop an enterprise data model that reflects the organization's fundamental business rules
4. Develop and refine the conceptual data model, including all entities, relationships, attributes, and business rules

Course Contents

UNIT-I

Database Systems: Introducing the database and DBMS, Files and File Systems, Problems with File System and advantages of Database Management systems. Database Administrator and his responsibilities, Physical and Logical data independence. Three level Architecture of Database System: the external level, conceptual level and the internal level.

UNIT-II

The Relational Database Model: A logical view of Data, Keys, Integrity Rules, Relational Set Operators, The Data Dictionary and the system catalog, Relationships within the Relational Database, Data Redundancy revisited, Indexes, Codd's relational database rules. Entity Relationship Model: The ER Model, Developing ER Diagram.

UNIT-III

Normalization of database tables: Database Tables and Normalization, The need for Normalization, The Normal forms and High level Normal Forms, de-normalization.

UNIT-IV

Relational Algebra, Different types of Joins, Relational Query Language - Introduction to SQL: Data Definition Commands, Data Manipulation Commands, Select queries, Advanced Select queries, Virtual Tables, Joining Database Tables.

UNIT-V

Transaction Management and Concurrency Control: What is transaction, Committed and uncommitted transactions, Protection against crashes – Backup, Journal, Audit trail. Concurrency control, Integrity violation Concurrency control with locking Methods, Concurrency control with time stamping methods, concurrency control with optimistic methods, database recovery management.

Suggested Readings:

Main Text Books

1. Principles of Database Systems, Ullman, Galgotia Publications, 2nd edition.
2. Database System Concepts, Silberschatz, Korth, Sudarshan, McGraw Hill, 5th edition.

3. An Introduction to Database System, Bipin C. Desai, Galgotia Publications.

Reference Books

1. An Introduction to Data Base Systems, C.J. Date, Narosa Publications, 8th edition
2. Database Principles, Programming and Performance, O'neil Patric and O'neil Elizabeth, Margon Kaufmann Publishers Inc., 2nd ed.
3. Fundamentals of Database Systems, Elmasri Ramez and Navathe Shamkant B., Addison-Wesley, 6th edition.



PAPER CODE BCA - 301
Discrete Mathematics

Teaching Objective

To understand the role of '**Discrete Mathematical Structures**' in scientific computing and logic development through practical exercises aspiring to be successful in the world of Computer Science.

Learning Outcomes

1. Able to identify propositions and non-propositions, construct the truth table of any compound proposition and use logically equivalent statements.
2. Able to explain concept of set and its operations.
3. To explain the difference between relation and function and their different types.
4. Able to define Boolean algebras, expressions and functions; give algebraic representations of the functioning of logic gates
5. Construct and simplify the Boolean expression representing circuits.
6. To identify different ways of representing a graph, path, cycles, complement of a graph, trees and its types
7. Understand meaning and type of Matrix, operations on matrix, rank and advance form of matrix
8. Learn and develop to solve system of linear equations using rank.

Course Contents

UNIT-I

Introduction and Preliminaries: Logical connectives, Truth tables, Tautologies and Contradiction, Logical equivalence, Algebra of propositions. **Set Theory:** Set, Singleton set, Finite and Infinite sets, Subsets, Proper subsets, Equality of sets, Union, Intersection and Difference of sets, Universal set, De Morgan laws, Symmetric difference of sets, Generalized De Morgan laws, Cartesian product of sets.

UNIT-II

Relations: Relation between two sets, Binary relation on a set, Types of binary relations, Equivalence relation, Equivalence class, Partition of a set, Fundamental theorem of equivalence relation, Composition of relations. **Functions:** Function or mapping, One-one, Many-one, into and onto mappings, Identity mapping, Constant mapping, Equality of mappings, Inverse of a mapping, Composition of mappings.

UNIT-III

Boolean algebra: Definition and properties of Boolean algebra, a brief introduction to the application of Boolean algebra to switching theory, conversion of complicated switching circuits to simple one, Disjunctive and Conjunctive normal forms. **Graph Theory:** Introduction to graph theory, Paths and Circuits, Trees, Spanning trees, Cut-sets, Fundamental circuits and cut-sets.

UNIT-IV

Matrices: Introduction, Expression of complex numbers in the form of a matrix, De Moivre's theorem, Elementary transformations, Elementary matrices, Equivalent matrices, Properties of

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equivalent matrices, Sub-matrix of a matrix, Rank and Nullity of a matrix, Row equivalence and canonical form, Normal form of a matrix.

UNIT-V

Solution of Homogeneous and Non-homogeneous system of linear equations, Characteristic roots and Characteristic vectors of a matrix, Caley-Hamilton theorem, to find the inverse of a non-singular matrix using Caley-Hamilton theorem.

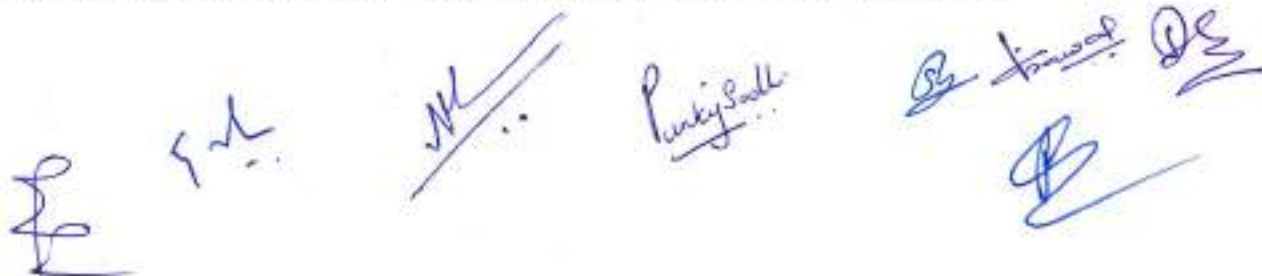
Suggested Readings

Main Text Books

1. Discrete Mathematical Structures with Applications to Computer Science by Tremblay & Manohar, McGraw-Hill Education.
2. Discrete Mathematics by Iyengar, Chandrasekharan, Venkatesh & Arunachalam, Vikash Publ.
3. Graph Theory with Applications to Engineering and Computer Science by Narsingh Deo, PHI
4. Discrete Mathematics by J.K. Sharma, Macmillan Publishers

Reference Books

1. Elements of Discrete Mathematics, C.L. Liu, McGraw-Hill Education
2. Discrete Mathematics, Richard Johnsonbaugh, Pearson Education.
3. Discrete Mathematical Structures, Kolman, Busby and Ross, Prentice-Hall India.

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PAPER CODE BCA - 302
Visual Basic.Net

Course Objective

This course is designed to familiarize students with the syntax of VB.NET, design of windows applications, connectivity with databases and design of web applications.

Learning Outcomes

After completion of this course student will be able to develop desktop application using event driven programming and object oriented approach.

Course Contents

UNIT-I

Introduction to VB.NET, Event Driven Programming, .NET as better, Programming Platform .NET Framework, .NET Architecture, CLR, The Just-In-Time Compiler, Garbage Collection, .NET Framework class library; introduction to VB.NET Development Environment, Creating Applications, Visual development & event drive Programming -Methods and events.

UNIT-II

The VB.NET Language- Variables -Declaring variables, Data Type of Variables, Arrays, Handling and Using Interfaces, Control flow statements: conditional statement, loop statement.

UNIT-III

VB.NET Language Controls: Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons. List Boxes, Combo Boxes, Picture Boxes, Scrollbars, Splitters, Timer, Menus, Built-in Dialogs Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars, OpenFileDialog, SaveFileDialog, Font Dialog, **Message box & Input box, Function creation.**

UNIT-IV

Understanding Delegates. Class Library Overview. Creating a Class Library. Working with the Class Library Understanding Built-In Classes. Creating User-Defined Classes. Understanding Constructors and Instance Variables., Introduction to Error Types: Understanding Syntax Errors, Understanding Runtime Errors and Using Exception Handling, Understanding Logical Errors and Using Break Points.

UNIT-V

Database handling using ADO.NET: Introduction to ADO.NET, architecture of ADO.NET, accessing and manipulating data using data providers and data sets. Components in data providers: Connections, Data adapters, Data Reader, Command, Data binding with controls like Text Boxes, List Boxes, Data grid etc. Navigating data source Data Grid View, Data validation.

Suggested readings:

Main Text Books

1. Mastering VB.NET by Evangelos Petroutsos, BPB publications
2. Introduction to .NET, Worx publication

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Reference Books

1. Christian Nagel,Bill Evjen,Jay Glynn, Morgan Skinner Professional C# 2005
2. Bill Evjen,Billy Hollis,Rockford Lhotka Professional VB.NET 2003



PAPER CODE BCA - 303
Introduction to Operating System

Course Objective

1. To learn the fundamentals of operating systems
2. To gain knowledge on the basics of instruction execution, processor registers and how components of system communicate with each other
3. To learn the concept of process and how OS manages processes and memory
4. To gain knowledge about the mechanisms of OS for synchronizing processes and understanding various problems of synchronization
5. To learn the concept of deadlocks and various algorithms for handling deadlocks
6. To understand various memory management techniques implemented by OS

Learning Outcomes

1. Analyze the structure of computer system and basic architectural components involved in OS design
2. Understand the concept of process and various states in its life cycle
3. Analyze CPU scheduling algorithms and solve numerical problems related to same
4. Explore the concepts of process synchronization and inter process communication
5. Understand deadlocks and techniques of handling deadlocks
6. Explore various algorithms for memory allocation and memory management techniques

Course Contents

UNIT-I

Computer System Overview, Basic Components of Computer System, Operating System Services, Functions of Operating System, Types of Operating Systems, Instruction Execution Cycle, Interrupts & System Calls, Interrupt Processing, Processor Registers, I/O Communication techniques

UNIT-II

Process Management: Concept of Process, Creation & Termination of Process, Process Attributes Process Control Block, Process State Models- Two State, Five State, and Seven State. CPU Scheduling: Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real-Time Scheduling.

UNIT-III

Process Synchronization: The Critical Section Problem, Peterson's Solution, Semaphores, Classical Problems of Synchronization, Monitors, Atomic Transactions.

UNIT-IV

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks: Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined approach to Deadlock.

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UNIT-V

Memory Management Strategies: Memory Hierarchy, Cache Memory, Swapping, Loading and Linking, Information Protection, Memory Allocation Techniques: Fixed partitioning, dynamic partitioning, Paging, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms

Suggested Readings:

Main Text Books:

1. Operating System Concepts- Silberschatz & Galvin, Addison Wiley Publication
2. Operating System- William Stallings, Prentice Hall India Learning Pvt. Ltd., 2nd edition.

Reference Books:

1. Operating Systems Design and Implementation- Andrew S. Tanenbaum, PHI Learning Pvt. Ltd.
2. The Design of Unix Operating System- Maurice J. Bach, Prentice Hall Publications.
3. Operating Systems: Three Easy Pieces- Remzi H. Arpaci-Dusseau, Arpaci, Dusseau Books



PAPER CODE BCA - 304
Communication Techniques

Course Objective

The course is designed to enable students to enhance ability to comprehension of spoken and written English (and use English) required for effective communication in their professional work.

Learning Outcomes

1. Enhancement of English Communication Skills
2. Effective oral presentation with the use of external aids like OHP, slides, etc.
3. Learn to write technical documents like reports, proposals, etc.

Course Contents

UNIT-I

Review of English Grammar; Written and Spoken Language; Common Errors in language; Punctuation (purpose, role, importance and use); OED; Language Skills (Listening, Speaking, Reading, Writing).

UNIT-II

Meaning what you mean; Listening: Effective and efficient listening in various situations (discussions, lectures, news, seminars, speech, telephone calls etc.); Reading: Purpose; Comprehension; Tactics and strategies for good reading; Writing: Guidelines for good writing; various writing styles (General and Technical writing styles). COMMUNICATION SKILLS: Listening-Definition, Process of listening, Strategies for effective listening, Difference between Listening and Hearing.

UNIT-III

COMMUNICATION (PURPOSE, ROLE, IMPORTANCE, ELEMENTS); EFFECTIVE AND EFFICIENT COMMUNICATION; ROLE OF CONTENT, CONTEXT AND LANGUAGE; SPOKEN AND WRITTEN COMMUNICATION; PRESENTATION AND DELIVERY; ROLE OF SPEAKER AND AUDIENCE; STYLE AND BODY LANGUAGE. Communication- Definition, Elements, Process, Importance, Principle of Communication, Speech, Verbal and Non Verbal Communication.

UNIT-IV

Planning, organization, presentation, participation, conduction and feedback of discussions, meetings, seminars etc; Effective and efficient presentation and discussion skills; Discussion and Presentation skills of conferences, meetings, seminars etc.

UNIT-V

General and Technical documents (correspondence (applications, letters, resumes, CV), drafts, proposals, précis, reports, summary, synopsis), Use of Audio-Visual Aids: OHP, Slides, Charts, Computers.

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REFERENCE:

1. WREN & MARTIN - GRAMMAR
2. BOOKS PRESCRIBED BY M.P. UCHHA SHIKSHA ANUDAN AYOG ARE THE TEXT BOOKS FOR THIS SYLLABUS.



Pinky Soodh. 



PAPER CODE BCA - 305
Computer Graphics & Multimedia

Course Objective

The goal of this course is to introduce the theory and practice of computer graphics. The course will assume a good background in programming in C or C++ and a background in mathematics including familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.

To understand the principles of computer graphics requires not only study of the literature, but experimental work on a graphics system. Therefore, as part of this course, the students will design and implement a substantial computer graphics program and will generate some complex illustrations with this system.

Learning Outcomes

1. Understanding the different display device and their technique and use.
2. Basic description of various input device and their use.
3. To understand the algorithm for different geometry object & develop the program using C/C++.
4. To use the geometric transformation & their category and solve through the example.
5. To use of multimedia object and understand the architecture of multimedia.

Course Contents

UNIT-I

Basics of Graphics System, Applications, Display Devices: Video Displays, Overview of CRT, Color CRT Monitor, Raster-Scan Displays, Random Scan Displays, DVST, Flat-Panel Displays, Input Devices: Keyboards, Mouse, Track Ball and Space Ball, Joysticks, Digitizers, Image Scanner, Touch Panel, Light Pens, Voice Systems Etc.

UNIT-II

Line drawing algorithms: DDA Algorithm, Mid-Point Line Drawing Algorithm, Bresenham's line Algorithm, Bresenham's Circle drawing algorithm, Mid-Point Circle Algorithm, Filled Area Polygon, Scan-line Polygon Fill Algorithm, Inside-Outside test, Boundary Fill algorithm, Flood-Fill algorithm, Pixel, Pixel addressing, Antialiasing.

UNIT-III

Clipping: Point Clipping, Cohen-Sutherland Line Clipping Algorithm, Line Clipping Using Non Rectangular Clip Windows, Polygon Clipping, Text Clipping, Window to View Port Coordinate Transformation.

UNIT-IV

Two-dimensional geometric transformation: Translation, Rotation, Scaling, Reflection, Shear, Matrix representation and Homogeneous coordinates. Composite transformation: Translations, Rotations, Scaling, General Pivot-Point Rotation and Scaling, Variation of Reflection and Shear with their matrix representation.

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PAPER CODE BCA - 305
Computer Graphics & Multimedia

Course Objective

The goal of this course is to introduce the theory and practice of computer graphics. The course will assume a good background in programming in C or C++ and a background in mathematics including familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.

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4. To use the geometric transformation & their category and solve through the example.
5. To use of multimedia object and understand the architecture of multimedia.

Course Contents

UNIT-I

Basics of Graphics System, Applications, Display Devices; Video Displays, Overview of CRT, Color CRT Monitor, Raster-Scan Displays, Random Scan Displays, DVST, Flat-Panel Displays, Input Devices: Keyboards, Mouse, Track Ball and Space Ball, Joysticks, Digitizers, Image Scanner, Touch Panel, Light Pens, Voice Systems Etc.

UNIT-II

Line drawing algorithms: DDA Algorithm, Mid-Point Line Drawing Algorithm, Bresenham's line Algorithm, Bresenham's Circle drawing algorithm, Mid-Point Circle Algorithm, Filled Area Polygon, Scan-line Polygon Fill Algorithm, Inside-Outside test, Boundary Fill algorithm, Flood-Fill algorithm. Pixel, Pixel addressing, Antialiasing.

UNIT-III

Clipping: Point Clipping, Cohen-Sutherland Line Clipping Algorithm, Line Clipping Using Non Rectangular Clip Windows, Polygon Clipping, Text Clipping, Window to View Port Coordinate Transformation.

UNIT-IV

Two-dimensional geometric transformation: Translation, Rotation, Scaling, Reflection, Shear, Matrix representation and Homogeneous coordinates. Composite transformation: Translations, Rotations, Scaling. General Pivot-Point Rotation and Scaling, Variation of Reflection and Shear and their matrix representation.

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UNIT-V

Introduction to Multimedia: Review of Multimedia, Multimedia Applications, Multimedia Systems Architecture, Multimedia Hardware, Multimedia Software, Representation and Operations on Various Multimedia Data Types: Text, Images, Graphics, Video and Audio. Introduction to Multimedia Authoring.

Suggested Readings:

Main Text Books:

1. Computer Graphics Herrington S. Prentice Hall.
2. Computer Graphics: Hearn & Baker.
3. Computer Graphics: Rogers.

Reference Books:

1. Computer Graphics with Multimedia: A Rajaraman Narosa.
2. Principles of Interactive Graphics: Newman & Sproul McGraw Hill.



PAPER CODE BCA - 401
Numerical Methods

Teaching Objective

To introduce the concept of Computer Oriented Numerical Methods.

Learning Outcomes

1. Able to understand the concept of approximate numbers, errors in numbers, representation of number in computer's memory and zeroes or roots of polynomial and/or transcendental equations.
2. To understand and learn various iterative techniques to solve simultaneous linear equations.
3. Able to understand various types of difference operators and their relationships.
4. To develop mathematical relationships for given observations of the variable using Interpolation techniques.
5. Able to understand the concept concerning numerical differentiation and Integration for a class of equidistant and unequal arguments.
6. To learn and understand numerical solution of ODE by techniques of Iterative methods.

Course Contents

UNIT - I

Computer Arithmetic, Floating point number operations, Normalization and their consequences, Emphasis on computational Algorithms, Numerical Errors, Iterative methods, Zeros of a single transcendental equation and zeros of polynomials using Bisection, False position, Newton-Raphson and Secant methods, convergence of solutions.

UNIT - II

Simultaneous linear equations, Solution of simultaneous linear equations, Gauss elimination method with pivoting, Gauss - Jordan method, Jacobi's iteration method and Gauss - Seidel iteration method, Ill-conditioned equations and refinement of solutions.

UNIT - III

Difference Operators and Interpolation: Definition of Forward, Backward, Shifting, Divided difference, Central and Averaging Operators and their relationships, Newton's forward difference, backward difference and divided difference interpolation formulae, Lagrange's Interpolation formula.

UNIT - IV

Numerical Differentiation and Integration:

Numerical Differentiation using Newton's forward difference, backward difference and divided difference interpolation formulae, General Quadrature formula, Newton Cote's integration, Trapezoidal rule, Simpson's one - third and three - eight rules.

UNIT - V

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Numerical Solution of Ordinary Differential equations by Euler's Method, Modified Euler's method, Taylor's series method, Picard's method, Runge Kutta, second order and fourth order methods, Predictor-corrector methods.

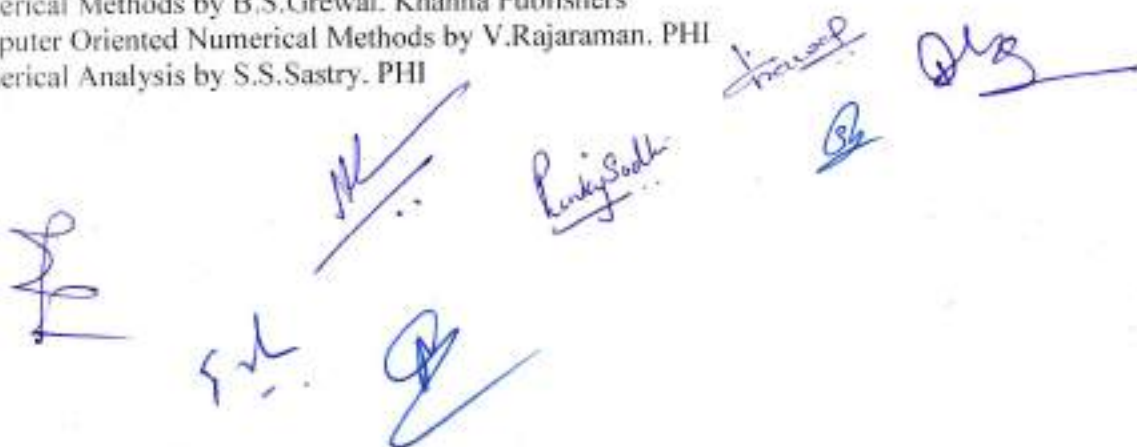
Suggested Readings:

Main Text Books

1. Numerical Methods for Scientific & Engg. Computer by Jain & Iyenger. New Age International Publishers
2. Numerical Method by E Balaguruswamy. TMH
3. Computer Oriented Numerical Method by R S Salaria. Khanna Publishers

Reference Books

1. Numerical Methods by B.S.Grewal. Khanna Publishers
2. Computer Oriented Numerical Methods by V.Rajaraman. PHI
3. Numerical Analysis by S.S.Sastry. PHI



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PAPER CODE BCA - 402
Advanced Computer Architecture

Course Objective

The course will provide understanding of the architecture and organization of computers and technical aspects of computer design.

Learning Outcomes

All students of computing should acquire some understanding and appreciation of a computer system's functional components, their characteristics, their performance, and their interactions. Students need to understand computer architecture in order to structure a program so that it runs more efficiently on a real machine

Course Contents

UNIT-I

Structure and Function, Computer Interconnection Structure, The Computer System, System Buses, Computer Function, Fetch and Execution Cycle, Interrupts, Multiple Interrupts By Interconnection And Bus Design, PCI Bus.

UNIT-II

Computer Memory System, And Their Characteristics, Semi-Conductor / Main Memory, Chip Packaging Error Correction, Cache Memory and It's Mapping.

UNIT-III

External Memory - Magnetic Disk Organization, RAID, Optical Memory, CD- ROM, VROM Magnetic Tape.

UNIT-IV

Input/Output External Devices, I/O Module Programmed I/O And Interrupt Driver, I/O Interrupt Controller.


UNIT-V

Programmable Peripheral Interface, DMA I/O Channels and External Interface. Assembly Language Programming: Detailed Study of 8086/8088 Assembly Language Instruction Set, Loops and Comparisons, Condition and Procedure, Arithmetic Operator Assembly Language, Illustrations Using Typical Programs Like: Table Search, Subroutines, Symbolic and Numerical Manipulations and I/O

Suggested Readings:

Main Text Books

1. Computer Organisation And Architecture - Stalling Williams - Phi
2. Computer Sustum Architecture ,Mano, M.M.,Prentice Hall Of India



Reference Books:

1. The Intel Microprocessors 8th Edition by Barry B Brey

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- Left side: A stylized signature.
- Below left: *Pinky Soodh* with a horizontal line underneath.
- Center: *S* with a horizontal line underneath.
- Top right: *B* with a horizontal line through it.
- Middle right: *Praveen* with a horizontal line underneath.
- Far right: *Sh* with a horizontal line underneath.
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PAPER CODE BCA - 403
Data Structure using C++

Course Objective

The goal of this subject is to introduce the theory and develop the algorithm of different types of data structure. Understanding the operation of different data structure and implement in C++. Explain use and application in real life for different data structure.

Learning Outcomes

1. Understand how data structures map onto physical memory.
2. Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include : arrays, linked lists, binary trees, heaps, and hash tables.
3. Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
4. Compare different implementations of the same or different data structure.

Course Contents

UNIT-I

Introduction To Data Structure, Array, Records, Stacks Introduction to Stack & Primitive Operation on Stack, Stack as an Abstract Data Type, Multiple Stack, Stacks Application: Infix, Post Fix, Prefix and Recursion, Introduction to Queues, Primitive Operations on the Queues, Queue as an Abstract Data Type, Circular Queue, Dequeue, Priority Queue, Applications of Queue.

UNIT-II

Pointer, Its Limitation and Operation, Linked List & their type: linear, circular & Doubly linked list, Operations on various type of linked list, application of Linked list: Polynomial manipulation.

UNIT-III

Tree: General & Binary Tree. Conversion of General to Binary Tree. Binary Search Tree (BST) & Its Representation And Operation. Traversal Methods- In Order, Preorder & Post Order, Application of Binary Tree: Manipulation of Arithmetic Expression. Multiway Search Tree. Balance Tree & Their Types.

UNIT-IV

Graph: Graph & Their Category & Representations, Traversing Technique: Breadth First & Depth First Search, Spanning Trees (St), Technique of Minimum Spanning Tree (MST), Application of Graphs: Pert & Related Techniques.

UNIT-V

Hashing and Hash Table. Introduction to file organization; Sequential, Indexed sequential, Relative & Direct file organization. Searching : Linear & Binary Search. Sorting: Concept, selection sort, Bubble sort merge Sort, Tree sort & Partition - Exchange sort.

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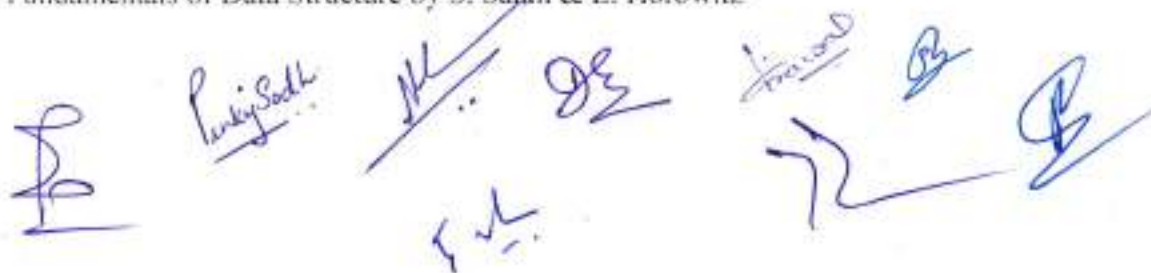
Suggested Readings:

Main Text Books:

1. Data Structure by Trembley & Sorrenson, Tata Mcgraw Hill.
2. Data Structures and Algorithms using C++, R.S. Salaria, Khanna Publishing
3. Data Structure by Lipschuists (Schaum's Outline Series Mcgraw Hill Publication)

Reference Books:

1. Data Structure and Program design in C by Kruse/Leung - PHI
2. Fundamentals of Data Structure by S. Sahni & E. Horowitz

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PAPER CODE BCA - 404
Accounting & Management Control

Course Objective

The course aims to develop the student's ability to, with the help of scientific theories and insights into practical application, analyse management control systems and thus be able to take the relevant decisions regarding organisational development.

Learning Outcomes

After completion of the course the student should be able to

1. helps in the Interpretation of Financial Information
2. describe models and methods relating to reporting, communication, decision making and accountability in the management control area.
3. apply models and methods of management control in different areas.
4. assess and critically reflect on different models and methods in management control.

Course Contents

UNIT-I

Meaning of Financial Accounts, Important concepts of Accounts, types of accounts, Rules of Journal, Simple journal entries, Cash Book – Types, Format of Cash book, Balancing of Cash Book, Ledger, posting of entries.

UNIT – II

Trial Balance, Adjustment Entries Relating to Closing Stock, Outstanding Expenses, Prepaid Expenses, Accrued Income, Unearned Income, Depreciation and Interests on Capital, Simple Final Accounts With The Above Adjustments.

UNIT – III

Meaning and need of material control, purchasing of materials, inspection of materials, FIFO and LIFO methods of outgoing material, their advantages and limitations.

UNIT – IV

Pay Master's Department, Pay Roll Accounting, Methods of Payments of Wages, and Overview of Computerized Method For Payroll Preparation. Treatment of Holiday Pay, Idle Time, Overtime etc. in Cost Accounts.

UNIT – V

Meaning and scope of financial management, functions of finance, Objectives of financial management, Mathematics of finance: Present value techniques, fund from operations, importance & usefulness of statement.

Suggested Readings:

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Main Text Books

1. Book Keeping by Grewal T.S.
2. Cost Accounting by S.K. Maheshwari

Reference Books

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PAPER CODE BCA - 405
Programming in Java

Course Objective

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms
3. Understand the principles of inheritance, packages and interfaces
4. Understand how Strings are treated and managed in Java
5. Understand exceptions and exception handling mechanisms in Java
6. Learn the multi threaded model of Java
7. Learn GUI programming using AWT and Swing and Event Handling

Learning Outcomes

1. Explain and define OOP principles in context to Java and write basic Java programs
2. Identify the usage of collections framework in Java
3. Understand the basics of String Handling in Java
4. Explain Java's exception handling mechanism in comparison to other programming languages
5. Analyze and implement interfaces in Java
6. Create and manage packages
7. Develop multithreaded applications using Java
8. Use UI components like windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, through AWT & Swing and apply event handling on these components

Course Contents

UNIT-I

Introduction to Java: Versions of Java, Features of java, C++ V/s Java, Setting up Java environment, Java virtual machine. Constants & Variables, Declaration of Variables, Types of Variables, Scope of Variables, Data Types in Java, Operators in Java, Control Statements in Java. **Arrays:** Creating One Dimensional & Two Dimensional Arrays

UNIT-II

Basic concepts of OOPS: OOPS terminology, Classes, Methods, Creating Instance & Class Variables, Accessing Class Members, Constructors, Method Overloading, Inheritance and its Types in Java, Method Overriding, Final Variables, Methods and Classes, finalize method, Abstract Methods & Classes, Visibility Control in Java. **Interfaces:** Defining Interfaces, Implementing and Inheriting Interfaces.

UNIT-III

Concept of Package: In-built Packages, Using In-Built Packages, Creating User Defined Packages, Accessing a User-Defined Package, Adding a Class to a Package, **Working with Strings:** String, StringBuffer, and StringBuilder. **Collections Framework:** Set, List, Queue, Maps.

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UNIT-IV

Exception Handling in Java: Types of Exceptions in Java, Try-Catch-Finally, Using Multiple Catch Blocks, Nested Try, Throw and Throws Keyword.

Multithreading in Java: Java Thread Model, Life Cycle Of a Thread, Creating Threads, Extending Thread Class, Stopping & Blocking A Thread, Thread Exceptions, Thread Priority, Thread Synchronization, Implementing Runnable Interface, Inter Thread Communication.

UNIT-V

Introduction to GUI Programming in Java: AWT: Basic GUI Components of AWT, Event Handling, Java Swing: Basic GUI Components of Swing, Difference between AWT and Swing

Suggested Readings:

Text Books

1. Java Complete Reference – Tata McGraw Hill Publications
2. Programming In Java, E. Balaguruswamy, Tata McGraw Hill Publications

Reference Books

1. Head First Java, Kathy Sierra & Bert Bates, O'Reilly Publications
2. Java Volume I & II – Pearson Education
3. Peter Norton Guide To Java Programming, Peter Norton, Techmedia Publication

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PAPER CODE BCA - 501

Differential Equations

Teaching Objective

The objective of this course is to strengthen the students in Differential Equations.

Learning Outcomes

1. Understand the concept of differential equations of first order and of higher orders.
2. Understand concept of linear differential equations of higher order with constant coefficients.
3. Able to solve Simultaneous differential Equation of first order.
4. Understand formulation and classification of Partial Differential Equations.
5. To solve Linear and Non-Linear PDE of first order.
6. Understand the methods to solve linear PDE of higher order with constant coefficients
7. To solve Linear differential equations of second order.
8. Understand application of PDE which include solution of one dimensional Heat and Wave Equation.
9. Understand concept of Power Series and learn various methods to solve it.
10. Understand the concept of Bessel and Legendre functions and derive recurrence relations for them.

Course Contents

UNIT-I

Differential Equations of First Order and First Degree: Homogeneous Differential Equations, Reducible to Homogeneous Differential Equations, Linear Differential Equations, Reducible to Linear Differential Equations, Bernoulli's Equation, Exact Differential Equations, Change of Variables.

Differential Equations of First Order and Higher Degree: Differential Equations solvable for p , solvable for y , solvable for x , Clairaut's Equation.

UNIT-II

Family of Curves: Linear Differential Equations of Higher order with constant coefficients, Differential Equations reducible to Linear Differential Equations with Constant Coefficients, Simultaneous differential equation of first order.

UNIT-III

Partial Differential Equations: Definition and Formation. Partial Differential equation of first order, Lagrange's method, standard forms, Charpit's method, Linear Partial Differential Equation of Higher order with Constant Coefficients.

UNIT-IV

Linear Differential Equations of second order, Application of Partial differential equation: Method of separation of variables, Solution of One dimensional wave equation and one dimensional heat equation.

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UNIT-V

Series Solution of Differential Equations: Power series method, Bessel and Legendre functions and their properties, Recurrence relations for Bessel function & Legendre function.

Suggested Readings:

Main Text Books

1. Ordinary and partial differential equations by M. D. Raisinghania - S. Chand & Company Ltd.
2. Higher Engineering Mathematics by B.S Grewal - Khanna Publishers

Reference Books

1. Advanced Engineering Mathematics by Erwin Kreyszig - Wiley
2. Differential equations by Shepley L. Ross - John Wiley & Sons, Inc
3. Elements of Partial Differential Equation by Snadden - Dover Publication
4. Differential Equations: An Introduction to Modern Methods and Applications by Brannan and Boyce- Wiley Publ.

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PAPER CODE BCA - 502
Software Engineering

Course Objective

The course objectives of Software Engineering Program are to produce graduates who, within three years after graduation, are able to:

- A. Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility;
- B. Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment; and
- C. Progress through advanced degree or certificate programs in computing, science, engineering, business, and other professionally related fields.

Learning Outcomes

At the time of graduation, all Software Engineering students will have demonstrated:

- 1. How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment
- 2. An ability to work in one or more significant application domains
- 3. Work as an individual and as part of a multidisciplinary team to develop and deliver quality software
- 4. Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle
- 5. Demonstrate an ability to use the techniques and tools necessary for engineering practice

Course Contents

UNIT- I

Introduction: Evolving Role of Software, Software characteristics, Software Designing Processes: Software Engineering, Software Process and Characteristics, Need of Software Development Life Cycle Models, Waterfall, Prototype, Spiral Model, RAD Model;

UNIT- II

Software Requirement Analysis and Specification: Requirement Elicitation Technique: Interview, Form Analysis, SRS and its Characteristics, Software Project Planning: Issues involved in Software Estimation, Size Estimation like lines of code and Function point method, Cost Estimation Model: COCOMO, Risk Management.

UNIT- III

Software Project Management Process: Feasibility Study, Project Planning, Project Execution, Project Termination, System Models: Data-flow models, Semantic data models, Object models, Inheritance models, Object aggregation, Service usage models, Data Dictionaries, Basics Software Design: Design Process, Design Fundamentals, Software Design Levels: Architectural Design, High Level design, detail design, Design Notations, Specification and Modularization, Design Structure Chart, Pseudo Codes, Flow charts, Coupling and Cohesion measures.

UNIT-IV

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Design Strategies: Function Oriented Design, Object Oriented Design, Basic concept of object-oriented analysis & Design. Traditional paradigm versus object oriented paradigm, software design approaches: Top-Down and Bottom-Up Design. Object-oriented design: Object aggregation; Service Usage; Object Interface Design; Design evolution, Function oriented design; Data-flow design; Structural Decomposition: Detailed design.

UNIT- V

Software Metrics: Software measurements What & Why, Token Count, Halstead Software Science Measures, Design Metrics, software testing. Test cases. Software Maintenance: Types of software Maintenance, Software maintenance model, Concept of Software Re-engineering & Software Reverse engineering- Definition, purposes and objectives. Introduction to UML class diagram object diagram, use case diagram, sequence diagram, activity diagram, component diagram, collaboration diagram.

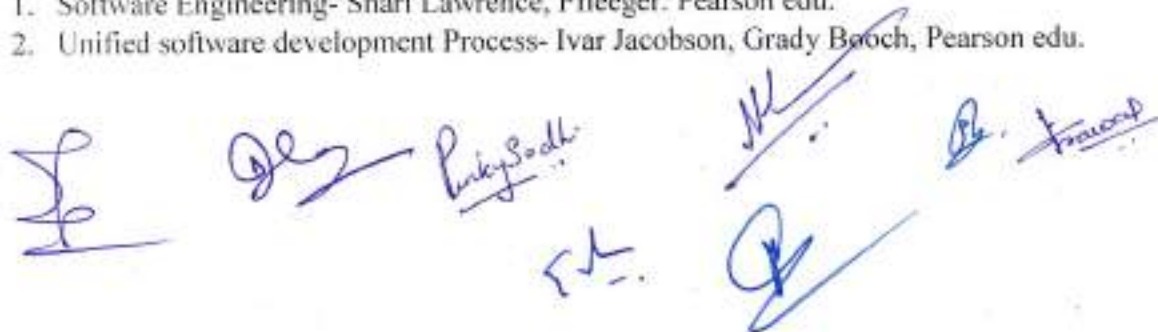
Suggested Readings:

Main Text Books:

1. Software Engineering - A practitioner's approach"- R.S.Pressman, 5th Ed., McGraw Hill Int.
2. Software Engineering (Principle & Practices Waman S. Jawadekar), Tata Mcgraw Hill
3. An Integrated approach to software Engineering, - Pankaj Jalote , Narosa Publication

Reference Books:

1. Software Engineering- Shari Lawrence, Pfleeger. Pearson edu.
2. Unified software development Process- Ivar Jacobson, Grady Booch, Pearson edu.





PAPER CODE BCA - 503
Artificial Intelligence & Expert Systems

Course Objective

The objective of this course is to introduce key concepts of artificial intelligence and application areas. Topics include planning, expert systems, machine learning, genetic algorithms, and natural language processing. Upon completion of this course, students should be able to apply various artificial intelligence techniques in developing intelligent systems.

Learning Outcomes

Students should understand the concepts of Artificial Intelligence and Expert System Concepts. Examine methods that have emerged from both fields and proven to be of value in recognizing patterns and making predictions from an application perspective.

Course Contents

UNIT- I

Introduction and applications of artificial intelligence, Problem solving : Defining the problem as state space search, Production system, Problem characteristics, Problem system characteristics, Search techniques: Generate and test , Hill climbing, Best first search, A* algorithm, Problem reduction, Expert system: Definition, Role of knowledge in expert system, Architecture of expert system.

UNIT- II

Expert system development life cycle: Problem selection, Prototype construction, Formalization, Implementation, Evaluation, Knowledge acquisition: Knowledge engineer, Cognitive behavior, Acquisition techniques, Knowledge representation: Level of representation, Knowledge representation schemes, Formal logic, Inference Engine, Semantic net, Frame, Scripts.

UNIT- III

Perception: Sensing, Speech recognition, Vision, Action, Neural networks: Introduction, Comparison of artificial neural networks with biological neural networks, Learning in neural networks, Perceptrons, Back propagation networks, application of neural networks

UNIT- IV

Fuzzy logic: Definition, Difference between Boolean and Fuzzy logic, fuzzy subset, fuzzy membership function, fuzzy expert system, Inference process for fuzzy expert system, fuzzy controller.

UNIT- V

Programming in Logic (PROLOG): Introduction, Prolog variables, Using rules, Input and Output predicates, Fail and cut predicates, Recursion, Arithmetic operation, Compound object, Dynamic database, Lists, String, File operations

Suggested Readings:

Main Text Books

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1. David W. Rolston: Principles of Artificial intelligence and Expert System Development, McGraw Hill Book Company
2. Elaine Rich, Kevin Knight: Artificial Intelligence, Tata McGraw Hill
3. Carl Townsend: Introduction to Turbo Prolog, BPB
4. Stamations V. Kartalopoulos: Understanding Neural Networks and Fuzzy Logic, PHI

Reference Books

1. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007
2. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007
3. Stuart Russel, Peter Norvig "AI - A Modern Approach", 2nd Edition, Pearson Education 2007.



PAPER CODE BCA - 504
Programming in Advance Java

Course Objective

1. Learn to differentiate between static and dynamic web applications
2. To Understand the MVC model of building a web application
3. To get an in-depth understanding of JDBC, Servlets, JSP and JavaBeans
4. To understand integrated development environment to create, debug and run web applications

Learning Outcomes

1. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC)
2. Create dynamic web pages, using Servlets and JSP
3. Make a reusable software components using Java Bean
4. Design GUI based web applications that are able to interact with databases, using in-built frameworks of Java

Course Contents

UNIT-I

Starting with Web Applications in Java: Introduction to web applications, Benefits of web applications, Web Architecture Models- Model 1 Architecture, Model 2 Architecture, Introduction to MVC Architecture: Model component, View component, Controller component.

UNIT-II

Introduction to JDBC: Introducing JDBC, Communicating with Database: Obtaining Connection, Creating JDBC Statement Object, Types of Statement Objects: Statement, Prepared Statement, Callable Statement, Executing SQL Statement, Closing a Database Connection, Creating DSN and Understanding Various JDBC Drivers; Creating Table by Using JDBC, Working With ResultSet Object.

UNIT-III

Introduction to Servlets: Need for Server Side Programming, What is a Servlet, Advantages of using Servlets, Understanding the Servlet API, Generic Servlet Class, Servlet Life Cycle, Servlet Request, Redirection, Servlet Config, Servlet Context, Session Tracking with Servlets, deploying a Servlet Application..

UNIT-IV

Introduction to JSP: Understanding JSP, JSP Architecture, Advantages of JSP, JSP Life Cycle, JSP Scripting Elements: Scriptlet, Expression, Declaration; JSP Implicit Objects, Directive Elements: Page, Include, Taglib; JSP Action Elements: Forward, useBean, Include, setProperty & getProperty, JSTL

UNIT-V

Introduction to JavaBeans: Concept of JavaBeans, Advantages of using JavaBeans, Components of JavaBeans: Properties, Methods and Events; JavaBean API

Suggested Readings:



Main Text Books

1. Java Complete Reference - Tata McGraw Hill Publications

Reference Books

1. Head First Java, Kathy Sierra & Bert Bates, Shroff Publishers
2. Head First Servlets & JSP, Basham Bryan, O'Reilly Publications
3. Mastering JavaBeans, Laurence Vanhelsuwe, Sybex Inc.



PAPER CODE BCA - 505

Oracle 8i

Course Objective

To enhance the knowledge and understanding of Database analysis and design. Enhance the knowledge of the processes of Database Development and Administration using SQL and PL/SQL. Use the Relational model and how it is supported by SQL and PL/SQL. Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as well as syntax and command functions. Solve Database problems using Oracle 9i SQL and PL/SQL. This will include the use of Procedures, Functions, Packages, and Triggers.

Learning Outcomes

Student will get exposure to work on databases using Oracle.

Course Contents

UNIT- I

RDBMS COMPONENTS – Kernel, Data Dictionary, Client-Server Architecture, Oracle Architecture, Oracle files and processes, Role of DBA

UNIT- II

Introduction: SQL*Plus and SQL, Data types in Oracle, DDL Statements, Computations on Table Data, Oracle Dual Table, Oracle Functions, Data Constraints, Grouping Data from Tables, Manipulating Dates, Pattern matching, Range Searching, Study of the clauses: Union, Intersect, Minus clause.

UNIT- III

Joining Multiple Tables (Equi Joins), Joining a Table to itself (self Joins), subqueries Creating views, Renaming the Column of a view, Updation, Selection, destroying views, Permission on the objects created by the user, GRANT statement, Object privileges, Referencing a table belonging to another user, Revoking the permission given, Sequences, Indexes.

UNIT- IV

Data Control Language (DCL), Data Security, Grant and Revoke, PL/SQL, Variables and type declarations, Loop structure, PL/SQL Blocks, Cursor/ Cursor loops, Types of stored PL/SQL Blocks, Exceptions

UNIT- V

Procedures & Functions - Concept, creation, execution, advantages, syntax, deletion, Triggers - Concept, use, how to apply database triggers, type of triggers, syntax, deleting, import, export.

Suggested Readings:

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Main Text Books

1. SQL, PL/SQL The programming - Lang. of Oracle Ivan Bayross - BPB
2. Oracle Database 12c The Complete Reference (Oracle Press) by Bob Bryla ; Kevin Loney - Oracle Press

Reference Books:

1. Oracle Database 12c SQL - Jason Price - Oracle Press
2. Oracle Database 12c PL/SQL Programming by McLaughlin - Oracle Press





PAPER CODE BCA - 601
Probability & Statistics

Teaching Objective

The objective of this course is to acquaint the students with basic concept of statistics that are useful in decision making problems.

Learning Outcomes

1. Understand the meaning and use of statistical terms.
2. Understand and apply descriptive statistical measures to model situations.
3. Understand and apply correlation and simple linear regression analysis.
4. Understand and apply probability distributions to model different types of situations.
5. Understand and apply statistical inference techniques (including statistical estimation and hypothesis testing)

Course Contents

UNIT-I

Introduction: Frequency distribution and Frequency charts, Histogram, Frequency polygons, Frequency curves and Cumulative frequency distribution, Ogives. **Measures of Central Tendency:** Arithmetic mean, weighted arithmetic mean, geometric mean, harmonic mean, median, mode, quartiles, deciles and percentiles. **Measures of Dispersion:** Range, mean deviation, semi-inter quartile range for quartile deviation, absolute and related dispersion, coefficient of variation.

UNIT-II

Moments, Skewness and Kurtosis: Moments of various types, relation between moments, Sheppard's correction, Skewness and kurtosis, moment generating functions. **Elementary Probability Theory:** Sample space, events, classical definition of probability, theorems on total and compound probability, independent and dependent events, mutually exclusive events, mathematical expectation.

UNIT-III

Probability Distributions: Discrete and continuous probability distributions, basic concepts and applications of Binomial, Poisson, Rectangular, Exponential and Normal distributions.

UNIT-IV

Regression and Correlation: Regression analysis, Least square fit, polynomial and curve fitting, Linear and non-linear regression algorithms, Linear correlation, measures of correlation, coefficient of correlation, rank correlation, multiple and partial correlation for three variables.

UNIT-V

Testing of Hypotheses: Simple and composite hypothesis, errors of kind-I and kind-II, critical region, level of significance. **Tests of Significance:** Tests for simple hypotheses, Chi-square, t, F and z tests, ANOVA-one way and two-way classification.

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Suggested Readings:

Main Text Books

1. Beri G.C. - Business Statistics. Tata McGraw Hill Education.
2. Sharma J.K. - Business Statistics. Pearson Education India.
3. Levin Rubin - Statistics for Management. Person Education India.
4. Gupta C.B. - An Introduction to Statistical Methods. Vikas Publ. House.
5. Gupta S.C. - Fundamental of Statistics. Sultan Chand & Sons.
6. Sancheti D.C. - Business Statistics. Sultan Chand & Sons.

Reference Books

1. Ken Black - Business Statistics. Wiley India.
2. Render and Stair JR - Quantitative Analysis for Management. Prentice Hall Publ.

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PAPER CODE BCA - 602

Networking Concepts

Course Objective

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Learning Outcomes

After completing this course the student must demonstrate the knowledge and ability to:

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.
4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
5. Identify the different types of network devices and their functions within a network.
6. Understand and building the skills of subnetting and routing mechanisms.
7. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Contents

UNIT-I

Data Communication System: Purpose, Components: Source, transmitter, transmission System, receiver, and destination. Data transmission: Frequency, Spectrum and Bandwidth. Time-domain and frequency domain Concepts. Relationship between data-rate and Bandwidth. Network topology with advantages and disadvantages.

UNIT- II

Analog and digital data transmission. Data and signal. Analog and digital signaling of analog and digital data. Modem, modulation techniques, codec, digital transmitter etc. Transmission impairments: attenuation and attenuation distortion, delay distortion, noise.

UNIT- III

Introduction to Network, OSI reference model, TCP/IP reference model. Transmission Media: Magnetic Media, Twisted-Pair cables, Baseband & Broadband Coaxial cables, Fiber Optics. Wireless Transmission: Radio Transmission, Microwave Transmission, Bluetooth, Infrared, Virtual LAN.

UNIT- IV

52.    
 

ISDN; ATM; data link layer: services, framing, error control, error-detecting & correcting codes, Data link protocols: stop-and-wait protocol, sliding window protocol. HDLC; static & dynamic channel allocation in LANS & MANS, FDDI.

UNIT-V

Multiple Access Protocols: ALOHA, CSMA/CD; IEEE standards 1002.3 and Ethernet, 1002.4; Token Bus; 1002.5; Token Ring. Bridges, Routers, Gateways, Routing Algorithm, Congestion control Algorithm, Internetworking, The TCP/IP Protocol, IP Addressing, Subnets, Supernets, IPv6.

Suggested Readings:

Main Text Books

1. Computer Networks by A. Tanenbaum. (Prentice Hall- publisher).
2. Data Communication & Networking by Forouzan. (Mc Graw Hill Publisher)

Reference Books

1. Data & Computer Communications by W. Stallins. (PHI- Publisher).

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ISDN; ATM; data link layer: services, framing, error control, error-detecting & correcting codes. Data link protocols: stop-and-wait protocol, sliding window protocol. HDLC; static & dynamic channel allocation in LANS & MANS, FDDI.

UNIT-V

Multiple Access Protocols: ALOHA, CSMA/CD; IEEE standards 1002.3 and Ethernet, 1002.4; Token Bus; 1002.5: Token Ring. Bridges, Routers, Gateways, Routing Algorithm, Congestion control Algorithm, Internetworking, The TCP/IP Protocol, IP Addressing, Subnets, Supernets, IPv6.

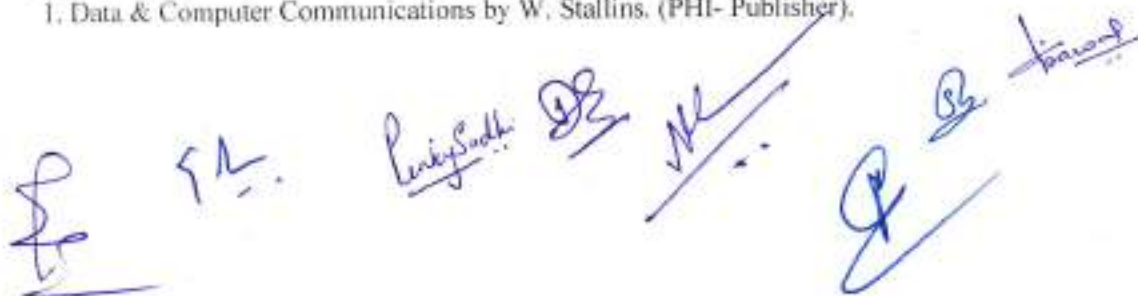
Suggested Readings:

Main Text Books

1. Computer Networks by A. Tanenbaum. (Prentice Hall- publisher).
2. Data Communication & Networking by Forouzan. (Mc Graw Hill Publisher)

Reference Books

1. Data & Computer Communications by W. Stallins. (PHI- Publisher).





PAPER CODE BCA - 603
Introduction to Asp.net & C#

Course Objective

1. Understand the difference between desktop and dynamic web applications.
2. Understand the ASP.NET web application execution model.
3. Create and modify multi-page Web Form applications that involve and demonstrate features such as flow control, the use of style sheets, state management, data access, data binding, security, and data verification and validation.

Learning Outcomes

1. Students will able to design web applications using ASP.NET
2. Students will be able to use ASP.NET controls in web applications.
3. Students will be able to debug and deploy ASP.NET web applications

Course Contents

UNIT- I

Programming in C#: Overview of C#, C# environment, datatype, type conversion, variables, constants, operators: Arithmetic Operators , Relational Operators, Logical Operators, Bitwise Operators, Assignment Operators, Misc Operators, , decision making, loops, overview of oop's: (encapsulation, inheritance, polymorphism, abstraction), class, object, methods, **inbuilt classes and methods.**

UNIT- II

Programming in C#: Arrays, **Collections**, String, Structure, Enum, Operator Overloading, Interfaces, Preprocessor Directives, Namespace, Regular Expression : Character escapes, Character classes, Anchors, Grouping constructs, Quantifiers, Backreference constructs, Alternation constructs, Substitutions, Exception handling, File I/O : StreamReader, StreamWriter, StringReader, StringWriter. C# Attributes, C# Properties, C# Reflection.

UNIT- III

Introduction to ASP.Net: Overview of ASP.NET framework, ASP.NET Application Life Cycle, page life cycle phases : Initialization, Instantiation of the controls on the page, Restoration and maintenance of the state, Execution of the event handler codes, Page rendering. Understanding ASP.NET Controls, Applications Web servers, installation of IIS. Web forms, web form controls -server controls, client controls, web forms & HTML.

UNIT- IV

Programming in ASP.Net: Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box, etc. Running a web Application, creating a multiform web project. Event Handling- Application and Session Events, Page and Control Events, **Master pages, Rich controls, Ajax Controls** Validation controls: RequiredFieldValidator, RangeValidator, CompareValidator, RegularExpressionValidator, CustomValidator, ValidationSummary. States of ASP.Net : View State, Control State, Session State, Application State.

UNIT- V

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Database connectivity in ASP.Net: Architecture of ADO.NET, Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class, Command Class, DataAdapter Class, Dataset Class. Display data on data bound Controls and Data Grid. Database Accessing on web applications: Data Binding concept with web, creating data grid, Binding standard web server controls. Display data on web form using Data bound controls.

Suggested Readings:

Main Text Books

1. Beginning ASP.Net in C#, Wrox Publications/Apress Publications
2. Beginning ASP.NET 4.5 in C# and VB, Wrox, 2012

Reference Books

1. Asp.Net Programming With Visual C# And Sql Server, Don Gosselin



PAPER CODE BCA - 604
Software Testing

Course Objective

The Objective of this course is to learn and apply basic skills needed to create and automate the test plan of a software project, to know how to plan, develop, and execute an automated test plan. Students should learn testing concepts, Test planning, Creating a test plan in Test Director, Breaking the test plan into manageable components, Designing test cases and test steps, Analyzing the test plan, understanding of Automation testing, Creating a script through recording.

Learning Outcomes

1. To be able to apply various test processes and continuous quality improvement
2. To be able to define the types of errors and fault models
3. To be able to use methods of test generation from requirements

Course Contents

UNIT- I

Introduction: Testing as an Engineering Activity, Testing as a process, testing axioms, basic Definitions Software Testing Principles, The Tester's Role in a software Development organization, The Defect Repository and Test Design, Developer/Tester Support for Developing a Defect Repository, Defect Prevention Strategies.

UNIT- II

Test Case Design : Test Case Design Strategies, Using Black Box Approach to Test case design, Random Testing, Requirements based testing, Boundary Value Analysis, Decision tables, Equivalence class partitioning, State-based testing, Cause-effect graphing, Error guessing, Compatibility Testing.

UNIT- III

Using White Box Approach to Test design, Test Adequacy Criteria, static testing vs. structural testing, code functional testing, Coverage and Control flow Graphs. Covering Code Logic, paths, their role in White box Based Test Design, Evaluating Test Adequacy Criteria.

UNIT- IV

Levels Of Testing : The Need for Levels of Testing, Unit Test, Unit Test planning, Designing the Unit tests, The Test harness, Running the unit tests and Recording results, Integration tests, Designing integration Tests, Integration Test Planning, scenario testing, Defect bash elimination, System Testing, Acceptance testing, Performance testing, Regression testing, testing OO systems, testing the documentation.

UNIT- V

Introduction to automatic testing & tools: Drawback of manual testing, Benefits of automatic testing, demerits of automatic testing, functional testing tools. Performance testing tools. Overview of automatic tool QTP : history, benefits, anatomy, main parts of QTP.



Suggested Readings:

Main Text Books

1. Srinivasan Desikan and Gopalaswamy Ramesh, Software Testing 'Principles and Practices', Pearson education.
2. Renu Rajani, Pradeep Oak, Software Testing - Effective Methods, Tools and Techniques, TataMcGraw Hill.

Reference Books:

1. Boris Beizer, Software Testing Techniques, Second Edition, Dreamtech.
2. Elfriede Dustin, Effective Software Testing, First Edition, Pearson Education.

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PAPER CODE BCA - 605
Mobile Application Development

Course Objective

The goal of this subject is to understand the different types of command use for different purpose in Linux. Understanding the mobile application technology using Android and develop the mobile apps by Android Studio.

Learning Outcomes

1. To understand Linux features & their Architecture.
2. Use of different commands (Related to Files, Directory, Disk, etc.).
3. Comparison of Mobile Operating System like Android, IOS & Windows.
4. To understand Android API level and different version, features and architecture.
5. To use of Android Studio for developing mobile apps.
6. Android components and use of Java and XML file for developing apps.
7. There are many small apps to develop and execute on real physical mobile.

Course Contents

UNIT- I

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell., Linux standard directories, Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons - cmp & comm, View files, disk related commands, Filters, Redirection Operator and File permission command.

UNIT- II

An Introduction to Mobile Computing- mobile Application Programming, Different Platforms. Operating systems-Architecture and working of Android, iOS and Windows phone, Comparison of Android, iOS and Windows phone, Android Development Environment -Advantages and Future of Android, Android Origin, Version and API level, Android Software Development Kit for Eclipse, Use of Android Studio.

UNIT- III

Android Software Development Platform - Understanding Java SE and the Dalvik Virtual Machine, The Directory Structure of an Android Project, Common Default Resources Folders, The Values Folder Leveraging Android XML, Screen Sizes, Launching Your Application, Configures Virtual Device/Real Device for execute Android Apps.

UNIT- IV

Android Framework Overview- The Foundation of OOP: The APK File, Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications, Activity Life Cycle, Programmatic intents.

The bottom of the page features several handwritten signatures and initials in blue ink. From left to right, there is a stylized signature, the initials 'G.M.', a signature that appears to be 'Pinky Sood', a signature that looks like 'B. M.', a large stylized signature, and a signature that appears to be 'K. Sood'.

UNIT- V

Views and Layouts, Buttons, Menus, and Dialogs, Graphics Resources in Android Introducing the Drawables, Implementing Images, Core Drawable Subclasses, Using Bitmap, PNG, JPEG and GIF Images in Android. Handling UI Events-An Overview of UI Events in Android, Listening for and Handling Events, Touchscreen Events, Keyboard Events, Context Menus, Controlling the Focus. Storing the Data Persistently, Working with Graphics and Animation, Audio, Video and Camera Services, Working with Bluetooth and Wi-Fi, Telephony and SMS,

Suggested Readings:

Main Text Books

1. Beginning Android 4, Onur Cinar, Apress Publication.
2. Professional Android 4 Application Development, Reto Meier, Wrox Publication.
3. Beginning Windows 8 Application Development, István Novák, Zoltan Arvai, György Balássy and David Fulop, Wrox Publication.

Reference Books

1. Professional Windows 8 Programming: Application Development with C# and XML, Allen Sanders and Kevin Ashley, Wrox Publication.
2. Android Application Development by Pradeep Kothari Black Book, Dream Tech Publ.

