MAHARAJA AGRASEN INTERNATIONAL COLLEGE, RAIPUR (C.G.)

(B+ Grade by NAAC Affiliated to Pt. Ravishankar Shukla University, Raipur)

Academic Year

2021-22

Syllabus for BCA

Department of Computer Application

Department of Computer Application
Academic Year 2021-22

SCHEME OF EXAMINATION 2019-2020
BCA PART- I

Subject Code	Subject Paper	Theory Marks		Internal Marks		Teaching Load per Week		
						L	T	P
		Max. (A)	Min. (B)	Max. (C)	Min. (D)			
BCA101	Discrete Mathematics	80	27	20	8	4	2	-
BCA102	Computer Fundamentals	80	27	20	8	4	2	-
BCA103	Programming in 'C' language	80	27	20	8	4	2	-
BCA104	PC Software and Multimedia	80	27	20	8	4	2	-
BCA105	Web Technology and E-Commerce	80	27	20	8	4	2	-
BCA106	Communication skills	80	27	20	8	4	2	-
BCA107	LAB I: Programming Lab in 'C'	100	50	40	16	-	-	3x2
BCA108	LAB II: PC Software Lab	100	50	40	16	-	-	2x2
BCA109	LAB III: Web Technology Lab	100	50	20	8	-	-	1x2
TOTAL		780	312	220	88			
GRAND TOTAL	(PAPER + INTERNAL)	**(A+C) 1000**		**(B+D)** 400				

- Student will have to pass individually in all theory, practical and sessional.

MAHARAJA AGRASEN INTERNATIONAL COLLEGE

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Department of Computer ApplicationAcademic Year

2021-22

BCA First Year

Name of the Program: **BCA**		Program Code: BCA I
Name of the Course: **Discrete Mathematics**		Max Marks:100
Course Code: **BCA 101**	Total Duration- 105 Hr	(Internal:**20** + External: **80**)

Course Objective: This Course will enable

1. Introduce concepts of mathematical logic for analyzing propositions and proving theorems.
2. Use sets for solving applied problems, and use the properties of set operations algebraically.
3. Work with relations and investigate their properties.
4. Investigate functions as relations and their properties.
5. Introduce basic concepts of graphs, digraphs and trees.

Syllabus

Unit	Topic	Duration (Hours)	Marks
1	Symbolic logic And Algebra of proposition Logical connectives, Kinds of Sentences Truth value of Statement, Truth Tables Tautology, Contradiction, Logical Equivalence Algebra of Preposition Predicates, Quantifiers	20	16
2	Boolean Algebra, Duality, Properties of Boolean Algebra Algebra of Preposition, Partial Order Relation Least Upper Bound, Greatest Lower Bound Algebra of Electric circuit Application Of Switching Circuit Design Logic gates and circuit, Multiple input Gates Equivalent Circuit, Simple Automatic Control System	22	16
3	Boolean Function-Minimal Disjunctive Normal Form Conjunctive Normal Form Many Terminal Network Symmetric function Binomial net	22	16

	Tree		
4	Cartesian Product of two Sets Relation, Binary Relation Inverse Relation Composite Relation Types of Binary Relation Equivalence Relation & it's Properties Partition, Quotient set, Countable Set Function or Mapping and it's kind Composite Mapping Inverse Function or Inverse Mapping	21	16
5	Graph and it's type Subgraph Operation On Graph, Labelling of graph Adjacency and incidence matrices Walk, Path, Circuit Connected and Disconnected Graph Application of Graph Trees And Their Properties Graph And Planner Graph	20	16

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Course Outcome: Students are able

1. To analyze logical propositions via truth tables.
2. To prove mathematical theorems using mathematical induction.
3. To Understand sets and perform operations and algebra on sets
4. To identify functions and determine their properties.
5. To define graphs, digraphs and trees, and identify their main properties.

References:

Discrete Mathematics (Dr. H. K. Pathak)

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Department of Computer ApplicationAcademic Year

2021-22

BCA First Year

Name of the Program: **BCA**		Program Code: BCA I
Name of the Course: **Computer Fundamental**		Max Marks: **100**
Course Code: **BCA 102**	Total Duration- 97 Hr	(Internal: **20** + External: **80**)

Course Objective: This Course will enable

1. To understand basic of computer and working with operating system.
2. To develop working skill with productivity tools, graphics designing and internet.
3. To acquire basic programming skill.
4. To apply computing in problem solving.

Syllabus

Unit	Topic	Duration (Hours)	Marks
1	Introduction of computer. characteristics and capabilities	20	16
	Computer Hardware and Software		
	Block Diagram of Computer.		
	Different Data Processing, Storing Data, Processing Data		
	Data, Data Processing System		
	Types of Computers: Analogue, Digital, Hybrid		
	Special Purpose Computers. Generation of Computers.		
2	Computer Peripherals Introduction to Input Devices	22	16
	Categorizing Input Hardware, Keyboard, Direct Entry Card Readers.		
	Scanning Devices- O.M.R., Character Readers, Thumb Scanner, MICR Smart Cards, Voice Input Devices.		
	Pointing Devices - Mouse, Light Pen, Touch Screen.		
	Computer Output: Output Fundamentals, Hardcopy Output Devices,)		
	Impact Printers, Non- Impact Printers, Plotters, Computer output Microfilm/Microfiche (COM) system		
	Softcopy Output Devices, Cathode Ray Tube, Flat Screen Technologies, Projectors, Speakers.		
3	Basic Components & Storage Central Processing Unit	20	16
	System software Vs. Application Software.		
	The Microprocessor, control unit		
	Registers, Buses, Main Memory, Main Memory (RAM)		

	for microcomputers.		
	Read Only Memory (ROM). Storage Devices: Storage Fundamentals, Primary and Secondary Storage. Computer systems, Mass storage systems and Optical Disks, CD ROM.		
	Data Storage and Retrieval Methods - Sequential, Direct & Indexed Sequential, Tape Storage and Retrieval Methods Tape storage Devices. characteristics and limitations		
	Direct access Storage and Microcomputers Hard Disks, Disk Cartridges, Direct Access Storage Devices for large		
4	Computer Software & Languages System Software: System software Vs. Application Software	20	16
	Types of System Software, Introduction and Types of Operating Systems		
	Boot Loader, Diagnostic Programs, BIOS, Utility Programs.		
	Application Software: Microcomputer Software		
	Interacting with the System, Trends in PC software		
	Types of Application Software, Difference between Program and Packages. Computer Languages; Definition,		
	Generations of computer languages, Types of Languages, Language Processors: Assembler, Interpreter, and Compiler.		
5	Operating System and Linux Introduction	15	16
	Uses of OS, Functions of OS, booting process, Types of Reboot, Booting from different OS		
	Types of OS, DOS, Windows		
	Linux Open-source Software concept and evolution of Linux Features of Multi-User Operating System;		
	Structure of Linux OS; Security Features of Linux, File System.		
	Directory Structure and related commands. Linux Editors & editor commands.		
	Linux commands cd, md, rm, mv, cp, Is, cat, find, grep.		

Course Outcome: Students will be able

1. Converse in basic computer terminology and working with operating system.
2. Formulate opinions about the impact of computer in society.
3. To understand the basic of programming skill.
4. Know and use different number system and the basics of programming for problem solving.

References:

1. Introduction to Information Technology, V Rajaraman, PHI Second Edition.
2. Computer fundamental, P.K Sinha, BPB Publication.
3. Fundamental of Information Technology: Chetan Shrivastava, Kalyani Publication.
4. Computers Today: Suresh S Basandra, Golgotia Publication.

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Department of Computer ApplicationAcademic Year

2021-22

BCA First Year

Name of the Program: **BCA**		Program Code: BCA I
Name of the Course: **Programming in C**		Max Marks: **100**
Course Code:**BCA 103**	Total Duration- 105 Hr	(Internal: 2**0** + External: **80**)

Course Objective: This Course will enable

1. Programming basics and the fundamentals of C.
2. Data types in C.
3. Mathematical and logical operations with string.
4. Using Structure and Union.
5. Arranging data in arrays.

Unit	Topic	Duration (Hours)	Marks
1	Overview, history, structure of C language.	20	20
	Tokens, keywords, data types constant, variable, operators and expressions		
	Operator precedence and associativity type casting		
	Console formatting		
	Unformatted I/O Function		
	Getch(),getchar(),getche (),getc(),putc(), putchar().		
	Basic programs		
2	Control constructs: If-Else, Conditional Operators,	25	20
	switch and break, nested conditional branching statement.		
	Brick and continuous go to and label exit function		
	Function definition function component's function arguments		
	Function call statement, function prototype, types of function		
	Scope and lifetime of variable called by value call by reference function using array function with command line argument		
	User defined functions and basic programs		
3	Array declaration, one and two dimensional numeric and character array	20	20
	Multidimensional area		
	String declaration initialization string manipulation with and without using library function		
	structure, union and enum		

	Declaring a structure and structure variable area of a structure area within a structure nested structure		
	Declaring union and union variable		
	Declaring enum and variable		
4	Definition of pointer declaration void pointer to pointer comparison	20	20
	Dynamic memory allocation		
	Pointer versus array, array of pointer, pointer to array		
	Pointer to function returning pointer passing function as argument to function pointer to a structure		
	Dynamic array of a structure through pointer		
	Dynamic array of structure through pointer to structure		
	Basic programs		
5	File handling and preprocessor	20	20
	File pointer file accessing functions		
	File handling through command line argument		
	Introduction to preprocessor		
	#include,#define.		
	Conditional compilation		
	Directives		

Course Outcome: Students will be able

1. To develop a basic C program.
2. Control the sequence of the program and give logical outputs.
3. Implement strings in your C program.
4. Store different data types in the same memory.
5. Manage I/O operations in your C program.

References:

1. C Programming Absolute Beginner's Guide
2. C: The Complete Reference
3. C Programming in easy steps.

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Department of Computer ApplicationAcademic Year

2021-22

BCA First Year

Name of the Program: **BCA**		Program Code: BCA I
Name of the Course: **PC Software and Multimedia**		Max Marks: **100**
Course Code: **BCA 104**	Total Duration- 105 Hr	(Internal:**20** + External: **80**)

Course Objective:

1. Introduce the basic features of Microsoft office, windows basics and file management.
2. Develops familiarity with word, Excel, access, PowerPoint, email and Internet basics.
3. Page formatting, book marks, mail merge, macros, Tables, file management, printing styles, linking and embedding object, Template.
4. To provide are in depth training in use of office automation and internet tools.

Unit	Topic	Duration (Hours)	Marks
1	Using Office with MS Word Introduction to word processing software and its features, creating new document.	20	16
	Saving documents, Opening and printing documents **Home Tab**: setting fonts, Paragraph settings. Various styles (Normal, No spacing. Heading? Tile, Strong)		
	Find & replace Format painter Copy paste and paste special.		
	Insert Tab: Pages, Tables, pictures, clipart, shapes, header & footer. word art, equation and symbols		
	Page Layout Tab: Page setup, page Background, Paragraph (indent and spacing)		
	Mailing Tab: Create envelops and Labels, Mail merge Review Tate Spelling and Grammar check,		
	New comment, Protect document. View Tab: Document views, Zoom, Window (New window, Split, Switch window)		
2	Working with MS-Excel Introducing Excel, Use of excel sheet	20	16
	Creating new sheet, Saving, Opening, and printing workbook		
	Home Tab: Font, Alignment, Number, Styles and cells and editing Conditional Formatting		
	Insert Tab: Table, Charts (column chart, Pie chart, Bar chart,Line chart) and Texts (header & footer, word art, signature line) **Page Layout Tab** Page setup options, Scale to fit width,		

	height, scale)		
	Formulas Tab Auto sum (sum, average, min, max), logical, and or not true, false), Math &trig (sin cos, tan, ceiling, floor, fact, mod, log), watch window.		
	Data Tab: Get external data from MS Access, Sort and filter options Data validation, Group and ungroup.		
	Review Tab: Protect sheet, Protect workbook, and Share workbook. View Tab: Page breaks, Page layout, freezing panes, Split and hide		
3	Working with MS-PowerPoint Introducing power point. Use of power point presentation, creating new slides saving, Opening and printing	20	16
	Home Tab: New slide, Layout, Reset, Delete, setting text direction, align test, convert to smart art, Drawing options.		
	Insert Tab: Table, picture, clipart, photo album, smart art, shapes and hart, movie and sound, hyperlink and action, test bus word art, object.		
	Design Tab: Page setup options, slide orientation, applying various themes, selecting background style and formatting it Animations Tab:		
	Custom animation for entrance, exit and emphasis, applying slide transition, setting transition speed and sound, animation on rehears timing		
	Slide show &view Tab: Start slide show options, setup options		
	View tab: Presentation views, colors and window option		
4	**Working with MS-Access** Front end and back end of application,	25	16
	Introduction to DBMS, Features of DBMS,		
	Creating blank databases. Saving it in accdb format. Defining data types is ms access.		
	Home Tab: Datasheet view, design view, pivot chart view, pivot table view, sort and filter options.		
	Create Tab: Creating table Creating reports, Query wizard. External.		
	Data Tab: importing data from access and excel sheet exporting data to excel and ms word.		
	Datasheet Tab: Relationships, Fields and columns options, Data type and formatting options.		
5	**Animations and Graphics** Basic Concept of 2D/3D Animation, Principle of animation, application of Multimedia,	20	16
	Hardware &software resources requirement for animation, introduction of various file formats (mpeg, gif, jpeg mp4, tif, flv)		

MAC

	Creating a newmovie in flash Get set Up Input Text, Animate Text, drawing and painting with tools, brush create basic shapes like Oval, Rectangle& Polystar Tools,		
	tools working with object & filing the object,		
	Transformations, object properties dialog box,		
	creating layers motion tweeing, shape tweeing, mask layers,		
	basic action scripts, importing sound through Flash		

Course Outcome: Students will be able to

1 Make documentation.

2 do accounting operations ·

3 perform their presentation skills.

4 perform their Animation Skills

References:

1. Microsoft Office 2007 fundamentals, L. Story, D Wall
2. MS Office, 5.3 Shriters, Firewall Media
3. Office 2000 made easy, Alan Neiber, Tata McGraw Hill
4. FLASHMX Bible, Rat Reinhart
5. Sams Teach Yourself Macromedia Flash8 in 24 Hours, Phillip Kerman
6. How do everything with Macromedia, Boele Hake, Dougsahlin
7. Miltimedia Making it works, Tay Vaughan, Tata McGraw Hill

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Department of Computer ApplicationAcademic Year

2021-22

BCA First Year

Name of the Program: **BCA**		Program Code: BCA I
Name of the Course: **Web Technology and E-Commerce**		Max Marks: **100**
Course Code:**BCA 105**	Total Duration- 98 Hr	(Internal: 2**0** + External: **80**)

Course Objective: This Course will enable

1. This course is intended to teach the basics involved in publishing content on the World Wide Web.
2. A student will be familiar with client server architecture and able to develop a web application using HTML.
3. To provide adequate knowledge and understanding about E-Com practices to the students.
4. Student will be able to recognize features and roles of businessmen, entrepreneur, and managers.

Unit	Topic	Duration (Hours)	Marks
1	Introducing Internet History, Evolution, Internet applications	18	16
	Intranet, WWW, Emergence of Web, Web page, Web Site		
	Web Servers, Web Browser, Search Engine		
	URL, DNS, Internet Connection		
	Internet Service Provider, Web Design Strategies.		
	HTTP, FTP, SMTP, TELNET Internet services: Email concept		
	Sending and receiving secure and Based chat services, Chat Services, Internet Messaging, Internet Relay Chat, NewsGroup.		
2	Introduction, HtmlVersion. The<!DOCTYPE Element, <HTML>Element, <Head>Element,<Title> element, <body> element. Creating headings on a web pages: Aligning the headings, creating list,	22	16
	Working with Links: Creating a Hyperlinks, Setting the Hyperlink Colours, Linking Different sections of A web page,		
	Creating Paragraph, Working with Images: Inserting image on a web page, Display Alternate Text for an image,		
	Adding a Border to an Image, Aligning an Image Using Images as Links, Working with Tables: Creating a Table, Specifying a Caption To a Table, Adding a Table Heading, Setting the table Border, Aligning a Table And cell content,		

	Changing background colour of a table, Setting Cell Padding and Cell Spacing, Spanning Rows and Columns,		
	Working with Frames: Creating a Frame, Creating Vertical and Horizontal Frames, Setting the Frame Border Thickness,		
	Applying Hyperlink Targets to a Frame		
3	Creating an HTML Form,	22	16
	Specifying the Action URL and Method to Send the Form,		
	HTML Controls.		
	CSS: Introducing Cascading Style Sheers,		
	Inline Styles		
	External Style Sheets, Internal Style Classes,		
	Multiple Styles.		
4	Introducing DHTML, Introducing JavaScript,	20	16
	Client-Side Benefits of using JavaScript over VB Script,		
	Embedding JavaScript in an HTML. Page, Handling Events, Using Variables in JavaScript		
	Using Array in JavaScript, Creating Objects in JavaScript		
	Using Operators		
	Working with Control Flow Statements,		
	Working with Functions		
5	Definition of E-commerce, The scope of E-commerce,	16	16
	Definition, Internet and its impact on traditional businesses,		
	E-payment System, Security threats with E-commerce.		
	Types of E-commerce: Business-to-Business (B2B),		
	Busine to-Consumer (B2C), Business-to-Business-to-Consumer (B2B2C),		
	Consumer-to-Consumer (C2C)		
	E-market, Future of E-market.		

Course Outcome: Students will be able

1 To Analyze a web page and identify its elements and attributes.

2. To develop a dynamic webpage by the use of java script and DHTML.

3. To effectively integrate IT-based solutions into the user environment.

4. To use current techniques, skills, and tools necessary for computing practice.

References:

1. Web Technologies, HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book, Dream Tech Press.

2. Internet, The Complete Reference Millennium Edition Margaret Levine Young, Doug Muder

3. The Complete Reference, 111M and CSS. Thomas A. Powell, McGraw Hill.

4. JavaScript The Complete Refer, as Powell, Fritz Schenider, McGraw Hill, Third Edition

5. Introduction To HTML, Kale Agrawal, O.P. Vyas, P.A. Agrawal.

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Department of Computer ApplicationAcademic Year

2021-22

BCA First Year

Name of the Program: B.C.A.	**Program Code: 131**	
Name of the Course: Foundation Course Paper II English Language	**Max. Marks: 80**	
Course Code: 106	**Total Duration:**	**98 hrs.**

Course Objective:

1. This course is designed to enable the students of computer education to speak and write English with a fare degree of grammatical correctness.
2. The inputs in the course contents are related to spellings, meanings of words and the correct use of words relating to the field of computers and other areas of knowledge

Unit	Topic	Duration (Hours)	Marks
1	Vocabulary, knowledge of at least one thousand words - their spelling, meanings and usage	18	20
	Phrases.		
2	Structure of sentences – Simple and Complex	20	30
	Compound sentences		
	Clauses and Subordinate clauses		
3	The Tenses and Aspects.	22	10
	The modal and the gerund		
	The participle and the infinitive		
4	Transformation of sentences: - 1. Interchange of Active and Passive Voice.	20	15
	2. Interchange of Affirmative and Negative Sentences		
	3. Interchange of Explanative and Assertive Sentences		
	4. Interchange of interrogative and Assertive Sentences.		
	5. Direct and Indirect Speech.		
5	Practical Application of Grammar	18	5
	Practice in talks, conversation and writing		
	Report Writing		
	Writing of Applications, Letter Writing		
	Description of events		

Course Outcome: Students will be able to

1. Use enhanced vocabulary and be fluent in English language.
2. Have improved receptive and expressive skills.
3. Construct sentences, able to use all types and forms of tenses.
4. Write a report on any event.
5. Write formal, informal letters and applications as per their need.

References:

1. Living English Structure, W.S. Allen
2. A Practical English Grammar, Thomson and Martinet

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MAHARAJA AGRASEN INTERNATIONAL COLLEGE, RAIPUR (C.G.)

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Academic Year

2021-22

Syllabus for BCA

Department of Computer Application

Department of Computer Application
Academic Year 2021-22

SCHEME OF EXAMINATION 2019-2020

BCA PART- II

Subject Code	Subject Paper	Theory Marks		Internal Marks		Teaching Load per Week		
						L	T	P
		Max. (A)	Min. (B)	Max. (C)	Min. (D)			
BCA201	Calculus and Differential Equations	80	27	20	8	4	2	-
BCA202	Database Management System	80	27	20	8	4	2	-
BCA203	Programming in 'C++`	80	27	20	8	4	2	-
BCA204	Computer Networks	80	27	20	8	4	2	-
BCA205	Operating Systems with Linux	80	27	20	8	4	2	-
BCA206	Foundation Course	80	27	20	8	4	2	-
BCA207	LAB IV: Programming Lab in 'C++'	100	50	40	16	-	-	3x2
BCA208	LAB V: Database Management System Lab	100	50	40	16	-	-	2x2
BCA209	LAB VI: Operating System Lab	100	50	20	8	-	-	1x2
TOTAL		780	312	220	88			
GRAND TOTAL	(PAPER + INTERNAL)	(A+C) 1000		(B+D) 400				

- Student will have to pass individually in all theory, practical and sessional.

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Department of Computer Application
Academic Year
2021-22
BCA Second Year

Name of the Program: **BCA**		Program Code: BCA II
Name of the Course: **Calculus & Differential Equation**		Max Marks: **100**
Course Code: **BCA 201**	Total Duration- 105 Hr	(Internal: **20** + External: **80**)

Course Objective: Students will learn about topics of discrete mathematics concepts such as

1. Limits & Continuity
2. Differentiation & Derivatives
3. Integrals

Unit	Topic	Duration (In Hours)	Marks
1	Limit & Continuity: - Object, Variable, Function	20	16
	Limit and its Theorem		
	Continuity		
	Discontinuity and it's type		
	Bounded Function		
	Differentiability Of Function		
	Necessary Condition for existences of a finite function		
2	Differentiation: -Differential Coefficient	22	16
	Differential Coefficient of sum of two function		
	Differential Coefficient of product of two function		
	Differential Coefficient of quotient of two function		
	Differential Coefficient of a function of function		
	Transformation		
	Successive differential coefficient		
	Nth derivative of some standard function		
	Leibnitz's theorem		
	Maxima & Minima		
	Concavity and convexity		
	Point of inflexion		
3	Indefinite Integral:(a) Indefinite integral	22	16
	(b) Definite Integral		
	Fundamental Rule of Integration		
	Extended form of Fundamental Formula		
	Integral by Parts		

	Integration by some Standard formulas		
	Integration by substitution		
	Trigonometry Integrals: Transcendental Function		
	Integration of $\sin^n x$, $\text{Cos}^m x$ and with different form of n,m.		
	Integration of fraction form of function		
	Integration of any rational function of sinx and cosx		
	Hyperbolic Function		
	Inverse Hyperbolic Function		
	Some additional standard forms		
4	Definite Integral: Theorem and its some practices	21	16
	General Properties of Definite Integral		
5	Differential equation of first order and first degree: Solution and constant of Integration	20	16
	The Derivative of Differential Equation		
	General and Particular Equation		
	Separation of variables		

Course Outcome:

1. Understanding logical Differentiation and Integration
2. Understand the solution method of Derivatives.
3. Understand and implement the method of Maxima and Minima.

References: Calculus & Differential Equation (Dr. H. K. Pathak)

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Department of Computer Application
Academic Year
2021-22
BCA Second Year

Name of the Program: **BCA**		Program Code: BCA I
Name of the Course: **Database Management System**		Max Marks: **100**
Course Code: **BCA 20**	Total Duration- 95 Hr	(Internal: **80** + External: **80**)

Course Objective:

1. Discuss Database management systems, databases and its applications
2. Familiarize the students with a good formal foundation on the relational model.
3. Outline the various systematic database design approaches
4. Describe the concepts of transactions and transaction processing and the issues, techniques related to concurrency and recovery manager.
5. Explore the File organizations, indexing and hashing mechanisms.

Unit	Topic	Duration (In Hours)	Marks
1	Overview of Database Management System	15	16
	Database, Definition of DBMS, Purpose of Database System		
	Data abstraction, In- stances and Schema, Data Independence		
	Data administration roles, Different kinds of DBMS users, Data Dictionary		
	Data base languages- DDL, DML, DCL Data Models- The Relational approach		
	The Network approach, The Hierarchical approach		
	DBMS storage structure and access method.		
2	Entity - Relationship model as a tool for conceptual design-entities attributes and relationships.	20	16
	ER diagrams;		
	Concept of keys: candidate key, primary key, alternate key, foreign key;		
	Strong and weak entities,		
	Case studies of ER modeling Generalization;		
	specialization and aggregation		
	Converting an ER model into relational Schema		
3	Relational Algebra: select, project, cross product	15	16
	different types of joins (inner join, outer joins, self-join)		

	set operations, Simple and complex queries using relational algebra		
	Integrity constraints: Not null, unique, check, primary key, foreign key.		
4	Normalization concept in logical model;	22	16
	Pitfalls in database design		
	update anomalies		
	Functional dependencies, Join dependencies,		
	Normal forms (1NF, 2NF, 3NF).		
	Boyce Codd Normal form,		
	Decomposition, Multi-Valued Dependencies, 4NF, 5NF.		
5	Introduction to Commercial database query language,	23	16
	SQL & its environment. SQL as a data definition language-		
	creating tables, altering tables, drop tables.		
	SQL as data manipulation language- Inserting, Deleting, Retrieving and updating data in a table		
	SQL as query language. Introduction to SQL constructs (SELECT…FROM, WHERE… GROUP BY… HAVING… ORDERBY….),		
	Temporary tables, Nested queries		

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Course Outcome: At the end of this Database Management Systems course, students will be able to:

1. Model Entity-Relationship diagrams for enterprise level databases
2. Formulate Queries using SQL and Relational Formal Query Languages
3. Apply different normal forms to design the Database
4. Summarize concurrency control protocols and recovery algorithms
5. Identify suitable Indices and Hashing mechanisms for effective storage and retrieval of Data

References:

1. Data base system: Korth & Silberschatz.
2. Data Base Management System: Alexies & Mathews [Vikas publication
3. An Introduction to Data base System: C.J. Date
4. Data Base Management System: Raguramakrishnan.

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(B+ Grade by NAAC Affiliated to Pt. Ravishankar Shukla University, Raipur)

Department of Computer Application
Academic Year
2021-22
BCA Second Year

Name of the Program: **BCA**		Program Code: BCA II
Name of the Course: **Programming in C++**		Max Marks: **100**
Course Code: **BCA 203**	Total Duration- 110 Hr	(Internal: 2**0** + External: **80**)

Course Objective:

1. The basic programming and OOPs concepts
2. Creating C++ programs
3. Tokens, expressions and control structures in C++
4. Classes and objects in C++
5. Constructors and destructors in C++

Unit	Topic	Duration (In Hours)	Marks
1	Language Fundamental Overview of OOP: The Object-Oriented paradigm	20	16
	Basic concepts of OOP, Benefits of OOPs		
	Object oriented languages, Applications of 00Ps		
	Overview of C++: History of C++, Data Types: Built-in data types, User-defined data types, Derived data types		
	Constants and Variables: symbolic constants, Dynamic initialization of variable, Reference variable Operators in C++.		
	Control Structures: if-else, nested if-else, while, do-while.		
	for, break, continue, switch, goto statement.		
2	Structures: A Simple structure. Defining a structure variable	20	16
	Accessing structure's member, Enumeration data type. Function:		
	Function Declaration, Calling Function		
	Function Definition, Passing Arguments to function		
	Passing Constant, Passing Value, Reference Argument. Structure as argument. Default Argument		
	Returning values from function: return statement, Returning structure variable.		
	Return by reference Overloaded Function, inline Function.		
3	Introduction about class and object	20	16
	Object Classes and Inheritance Object and Class		

	Defining the class and its member, Making an outside function inline.		
	Nesting of member function, array a class member, structure and classes.		
	Memory allocation: memory allocation for objects, new and delete operator, static data member, static member functions.		
	Object as function argument. Constructor & Destructor: Null and default constructor		
	Parameterized constructor, Constructor with default argument, copy constructor, class destructors.		
4	Pointers and Inheritance Pointers	25	16
	Introduction, & and operator, pointer to object,		
	this pointer, pointer to derived class. Inheritance		
	Introduction to inheritance. Types of inheritance, function overriding.		
	Constructor in Derived class.		
	Access specifiers: public, private, protected		
5	Polymorphism Dynamic polymorphism: Virtual function,	25	16
	Pure Virtual Function, Abstract class. Static Polymorphism: Operator keyword		
	overloading unary operators ++ (pro increment and post increment), --) using operator function		
	Overloading binary operators. Friend function, Friend class		
	Overloading binary operators using friend function		

Course Outcome: After completing this course, you will be able to:

1. Describe OOPs concepts
2. Use functions and pointers in your C++ program
3. Understand tokens, expressions, and control structures
4. Explain arrays and strings and create programs using them
5. Describe and use constructors and destructors

References:

1. Object Oriented Programming with C++ E Balagurusamy, The McGraw-Hill
2. Let Us C++ Yesvant Kanetkar, BPB Publications
3. The C++ Programming Language: Bjarne Stroustrup, Addision Wasley
4. Object Oriented Programming in C++ Robert Lafore, Galgotia Publications.

Recommended Web Reference:

• NPTEL Course on Programming in C++
(https://nptel.ac.in/courses/106/105/106105151/)
• NPTEL Course on Data Structures and Algorithms
(https://nptel.ac.in/courses/106/102/106102064/)

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(B+ Grade by NAAC Affiliated to Pt. Ravishankar Shukla University, Raipur)

Department of Computer Application
Academic Year
2021-22
BCA Second Year

Name of the Program: **BCA**		Program Code: BCA II
Name of the Course: **Computer Networks**		Max Marks: **100**
Course Code: **BCA 204**	Total Duration- 105 Hr	(Internal: 2**0** + External: **80**)

Course Objective:

1. To understand the different Network Models.
2. To develop an understanding of computer networking basics.
3. To develop an understanding of different components of computer networks, variousprotocols, modern technologies and their applications
4. To apply the concepts of layered architecture in assessing the placement of networkdevices.

UNIT	TOPIC	DURATION (In Hours)	MARKS
1	Data Communication, Networks-Distributed Processing Network Criteria, Applications Protocol and Standards, Standard Organization, Line Configuration - Point to Post, MultiPoint, Topology- Mesh, Star, Tree, Bus, Ring, Hybrid, Transmission mode, Categories of Network-LAN MAN WAN, Inter Networks	20	16
2	Analog and Digital digital data transmission parallel transmission Serial Transmission DTE-DCE interface data terminal equipment, data circuit terminating equipment standards, modem Transmission rate, Modem standards	25	16
3	ISO organization. The model - Layered architecture, functions of the layers -Physical layer Data Link Layer Network Layer Transport Layer Session Layer Presentation Layer Application Layer	25	16

4	The TCP/IP reference model, comparison of TCP/IP & OSI, Introduction to Internet – ARPANET, Architecture of Internet Client Server model, www, IP Address Classes, Protocols: IP, HTTP, TCP, FTP, ARP.	20	16
5	Introduction of Network Security and its importance. Cryptography: Definitions, Symmetric Key Cryptography: Traditional Ciphers, Simple modern Ciphers, Asymmetric Key Cryptography: RSA, Security Services Digital Signatures.	15	16

Course Outcome:

1. Familiar with the different Network Models.
2. Understand different network technologies and their application.
3. Update with different advanced network technologies that can be used to connect different networks.
4. Familiar with various hardware and software that can help run a smooth network.

References:

1. Introduction to Data communication & Networking - Behrouz & Forum
2. Computer Networking-Andres & Tanenbaum

Recommended Web Reference:

- https://nptel.ac.in/courses/106/105/106105081/
- https://www.tutorialspoint.comdata_communication_computer_network/index.htm

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Department of Computer Application
Academic Year
2022-23
BCA Second Year

Name of the Program: **BCA**		Program Code: BCA II
Name of the Course: **Operating System With Linux**		Max Marks: **100**
Course Code: **BCA 205**	Total Duration- 105 Hr	(Internal: **20 +** External: 80)

Course Objective: Students will learn about subject and its usage in software engineering such as

1. General understanding of structure of modern computers.
2. Purpose, structure and functions of operating systems.
3. Illustration of key OS aspects by example

Unit	Topic	Duration (In Hours)	Marks
1	**Introduction:** Defining operating system	20	16
	History and evolution of operating system		
	Basic Concept: Batch processing, spooling, multiprogramming, multiprocessor system, time-sharing, real-time system		
	Functions and Goals of operating system		
2	**Process Management:** Process concept, Process control Block	21	16
	Process State: State Transition Diagram		
	Scheduling Queues: Queuing Diagram, Types of Schedulers Context switching and dispatcher		
	Various types of CPU scheduling algorithm and their evolution		
	Multilevel Queue and multilevel feedback queue		
3	**Memory Management**: Preliminaries of memory management, Contiguous Memory Allocation	20	16
	Fragmentations, Partition Allocation Policies, compaction		
	Non – Contiguous memory allocation, Paging, Segmentation, **Virtual Memory:** Demand Paging, Swapping, Page Replacement Policies: FIFO, Optimal, LRU, MRU		
4	**Introduction To Unix**	22	16
	Introduction to Multiuser System, Emerging and history of Unix		
	Feature and benefits, Versions of Unix, System Structure: - Hardware requirement, Kernal and its function, introduction to system calls and Shell		
	File System		
	Feature of Unix File System, Concept of i- node table. Link		

	Commonly used commands like who, pwd, cd, mkdir, mv, rm, ls, lp chmod, co, grep, sed, awk, pr, lex, yacc, make, etc.		
	Getting started (login/logout)		
	Vi Editor: Intro to text processing, command and edit mode, invoking vi, command structure,		
	Deleting and inserting line, deleting and replacing character searching strings.		
5	**Shell Programming:** Introduction to shell feature, wild card characters, i/out redirections, standard error redirection	22	16
	System and user created shell variables, profit files, pipes/ tee,		
	Background processing, command line argument		
	Command substitution, read statement, condition execution		
	Special shell variable $ #, #? $* etc.		
	Shift commands, loops and decision making – for, while and until, choice making using case, decision making if…fi, using test, string comparison, numerical comparison,		
	Logical operation, using expr.		

Course Outcome: By the end of the course student should be able to

1. Describe the general architecture of computers.
2. Describe, contrast and compare differing structures for operating systems.
3. Understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files

In addition, during the practical exercise and associated self-study, student will

1. become familiar (if not already) with the C language, gcc compiler, and Make files.
2. Understand the high-level structure of the Linux kernel both in concept and source code.
3. Acquire a detailed understanding of one aspect (the scheduler) of the Linux kernel

References:

1. Operating System Concepts, Abraham Silberschatz, Peter B Galvin and Greg Gagne (Wiley India Edition).
2. Modern Operating System, Andrew S. Tanenbaum (PHI).
3. UNIX Complete Reference

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Department of Computer Application
Academic Year
2022-23
BCA Second Year

Name of the Program: **B.C.A.**	Program Code: **132**
Name of the Course: **Foundation Course**	Max. Marks: **80** Min. Marls: **27**
Course Code: **206**	Total Duration: 9**8 hrs.**

Course Objective:

1. This course is designed to enable the students of computer education to speak and write English with a fair degree of grammatical correctness.
2. The inputs in the course contents are related to spellings, meanings of words and the correct use of words relating to the field of computers and other areas of knowledge

Unit	Topic	Duration (In Hours)	Marks
1	Indian Art. Meaning of art, features of Indian art, elementary knowledge of paintings, music, dancing, sculpture archaeology, iconography & other social arts	18	16
2	Indian Literature. Ancient Indian Literature.	20	16
	Elementary knowledge of Vedic Literature.		
	Mahabharata, Ramayana and other main granthas		
3	Indian Freedom Struggle: Freedom Struggle of 1857	22	16
	National Consciousness, Non - Cooperation Movements		
	Civil disobedient movement, Quit India movement, contribution of revolutionaries in freedom struggle		
4	Indian Constitution. Introduction, main features of constitution	20	16
	Fundamental rights		
	Parliamentary Government. Meaning Features. Rajya Sabha, Lok Sabha		
5	Communication: Process, Channels, Barriers	18	16
	Listening: Types, Purpose, Barriers		
	Effective Listening Strategies		
	Job Interviews, Resume Writing, Job Application Writing		
	Group Discussions, Interview Preparation		

Course Outcome:

1. Students will gain knowledge on ancient Indian Culture and Literature.
2. Students will gain knowledge on Freedom struggle of India and events related to it.
3. Students will gain knowledge on Parliamentary functioning of Indian government.
4. Students will become effective listeners will be able to use this skill in honing their professional know – how.
5. Students will be able to write formal, informal letters and applications as per their need.
6. Students will be able to write effective resume and will be pre prepared for job interviews.

References:

1. Indian Culture, the book sponsored by M.P. Hindi Granth Academy
2. Parliamentary Procedure in India by A. R. Mukherjee
3. Effective Technical Communication by M Ashraf Rizvi

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(B+ Grade by NAAC Affiliated to Pt. Ravishankar Shukla University, Raipur)

Academic Year

2021-22

Syllabus for BCA

Department of Computer Application

SCHEME OF EXAMINATION 2020-2021
BCA PART- III

Subject Code	Subject Paper	Theory Marks		Internal Marks		Teaching Load per Week		
		Max. (A)	Min. (B)	Max. (C)	Min. (D)	L	T	P
BCA301	Statistical Analysis	80	27	20	8	4	2	-
BCA302	Programming in Java	80	27	20	8	4	2	-
BCA303	Dot Net Technology	80	27	20	8	4	2	-
BCA304	Software Engineering	80	27	20	8	4	2	-
BCA305	Data Structure	80	27	20	8	4	2	-
BCA306	Computer System Architecture	80	27	20	8	4	2	-
BCA307	LAB VII: Programming Lab in Java	100	50	40	16	-	-	3x2
BCA308	LAB VIII: Dot Net Technology Lab	100	50	40	16	-	-	2x2
BCA309	Project	100	50	20	8	-	-	1x2
TOTAL		780	312	220	88			
GRAND TOTAL	(PAPER + INTERNAL)	(A+C) 1000		(B+D) 400				

- ***Student will have to pass individually in all theory, practical and sessional***

MAHARAJA AGRASEN INTERNATIONAL COLLEGE

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Department of Computer ApplicationAcademic Year

2021-22

BCA Third Year

Name of the Program: **BCA**		Program Code: **BCA III**
Name of the Course: **Statistical Analysis**		Max Marks: **100**
Course Code:**BCA301**	Total Duration- 100 Hr	(Internal:**20**+External:**80**)

Course Objective:

1. To understand basic theoretical and applied principles of statistics needed to enter the job force.
2. To communicate key statistical concepts to non-statisticians.
3. To gain proficiency in using statistical software for data analysis.
4. To understand about different frequency distribution

Syllabus

Unit	Topic	Duration (In Hours)	Marks
1	Combinatorics: Permutation Combination Repetition Constrained Repetition Binomial Coefficients Binomial Theorem.	22	16
2	Frequency Distributions: Histograms and frequency polygons Measures of central tendency, Mean, Mode Median, Dispersion Mean Deviation and standard deviation Moments Skewness Kurtosis	20	16
3	Elementary probability theory: Definition Conditional probability distribution Mathematical Expectation. Theoretical distribution, Binomial Poisson and Normal distribution Relation between the binomial poisioned Normal distribution	18	16

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4	Correlation and Regression: Linear Correlation Measure of Correlation Least Square Regression. Curve fitting: Method of least square, least square line Least squares parabola Chi-square test, Definition of chi-square Signification test; Contingency test Coefficient of contingency	20	16
5	Basic of sampling theory: Sample mean and variance Student t-test Test of hypotheses and significance, Degree of freedom Z-test small and large sampling Introduction to Monte Carlo method	20	16

Course Outcome: Students will be able to

1. To understand basic theoretical and applied principles of statistics
2. To communicate key statistical concepts to non-statisticians.
3. To gain proficiency in using statistical software for data analysis and to solve correlation and regression.
4. To understand about different frequency distribution and learn about to measure central tendency using different techniques.

Reference:

1. Gupta, C.B. Statistical Method- Sultan Chand, Delhi.
2. Gupta, S.C. and Indra Gupta Business Statistical- Himalaya Publication House, New Delhi.
3. Gupta, S.P. – Business Statistics- S. Chand and Company, Delhi

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Department of Computer ApplicationAcademic Year

2021-22

BCA Third Year

Name of the Program: **BCA**		Program Code: **BCA III**
Name of the Course: **Programming in Java**		Max Marks: **100**
Course Code: **BCA 302**	Total Duration- 100 Hr	(Internal:20 External :80)

Course Objective:

1. To understand the basic concepts and fundamentals of platform independent object-oriented language.
2. To demonstrate skills in writing programs using concepts of inheritance, polymorphism, interfaces and packages, exception handling techniques and multithreading.
3. To understand streams and efficient user interface design techniques.
4. Design event driven GUI and web related applications which mimic the real word scenarios.

Syllabus

Unit	Topic	Duration (In Hours)	Marks
1	Introduction: Genesis of java, importance to the Internet, overview of features. OOP: OOP features, data types, control structures, arrays, methods and classes nested & inner classes, string and String Buffer class, Wrapper Class, vectors	18	16
2	Operators: Arithmetic Operators, Relational Operators, Logical Operators. Bit wise Operators, Conditional Operators, new operator, instance of operator. Control Statements: Java's Selection statement, Iteration Statement, Jump Statement, Array: Declaring Array variables, Constructing an Array, Initializing an Array, Multidimensional Arrays, Anonymous Arrays	25	16
3	Introducing Classes: Class Fundamentals, Declaring Object, Assigning Object Reference Variables, Defining Methods, method overloading. Using objects as parameter, Constructors, Garbage collection, finalize	18	16

	() method. Inheritance.		
	Inheritance basic, method overloading, object reference this and super, Chaining constrictor using this and super 0.		
	Member accessibility modifier: public, protected, default		
	accessibility of member, private protected, private		
4	Package: Define package, CLASSPATH, importing package,	18	16
	Interface: Define an interface, implementing interface, extending interface, variable in interlace,		
	Overview of nested class: Top level nested class and interface		
	Fundamental: exception types, using try and catch,		
	Throwing exceptions, defined exceptions		
5	Java spread model, creating threads, and thread priorities.	21	16
	Multithreaded Programming: synchronization. Suspending resuming and stopping threads		
	Input/output: Basic Streams, Byte and Character Stream, predefined streams,		
	Reading and writing from console and files. Using standard Java Packages (lang,util,lo)		
	JDBC: Setting the JDBC connectivity with backend database		

Course Outcome: After successful completion of the course, the students are able to

1. Use the syntax and semantics of java programming language and basic concepts of OOP.
2. Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
3. Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.
4. Design event driven GUI and web related applications which mimic the real word scenarios.

References:

1. The Complete Reference Java Herbert Schildt, Publisher-TMH
2. A Programmer Guide to Java Khalid A. Mughal, R.W. Rasmussen
3. Web Enabled Commercial Application Java 2 Ivan Bayross Publisher- B.P.B
4. Java Primer by EBalagurawami
5. Java Programing-Khalid Mughal

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Department of Computer ApplicationAcademic Year

2021-22

BCA Third Year

Name of the Program: **BCA**		Program Code: BCA III
Name of the Course: **Dot Net Technology**		Max Marks: **100**
Course Code: **BCA 303**	Total Duration- 100 Hr	(Internal:**20** + External: **80**)

Course Objective:

1. Design, formulate, and construct applications with VB.NET
2. Integrate variables and constants into calculations applying VB.NET
3. Determine logical alternatives with VB.NET decision structures and array technique.
4. Implement lists and loops with VB.NET controls and iteration
5. Separate operations into appropriate VB.NET procedures and functions

Unit	Topic	Duration (In Hours)	Marks
1	Inside the .Net Framework Overview of Net framework, Features of .Net, CLR, Common Language Specification, MSIL, Namespace, FCL., Assemblies, Common Type System Cross Language, Interoperability, JIT compilation,Garbage Collection	20	16
2	Programming with VB.net Type Conversions, Operators, Control Structure: Conditional Statement, loops(do loop, for loop, while loop, for Each... Next loop) arrays, Declaring arrays, Static arrays, Types, Structure, dynamic arrays Enumeration, Sub Procedure, Functions**.** Data types, Variables, Constant,	20	16
3	Windows Form Windows Form: Working with visual Studio IDE, Creating a .Net Solution, simple forms, MDI forms, windows form Control class, TextBox, Richtextboxes, Labels, Button, Checkbox,	20	16

	Radio Button		
	Panels, Group box, Listbox, Checked list box, Combobox, Picture box, Scrollbar, Timer, Trackbar,		
	Progress bar. Msgbox Function, Message Box Show Method, Input Box function,		
	Creating MDI application Menus, creating Menu, sub menu Items, Context Menu.		
4	OOPS concept	20	16
	Class and objects, creating classes,		
	Objects, creating data member, creating class shared data member,		
	Shared methods, shared properties, overloading methods and properties, with statement,		
	constructor,Destructor using finalize method), Inheritance,		
	overriding base class member, inheriting		
	Constructoroverloading base class member		
5	Database Programming Database concept, Ado.net Architecture	20	16
	Net Data Provider Connection OledbConnection, SqlConnection,		
	Command class SqlCommand class,		
	Dataset Component, Creating Database application using windows formaDB connectivity through ADO.Net),		
	OleDbCommand clan, class DataAdapter class, DataReader class),		
	accessing data from database,		
	Navigate in data, working with Data Grid		

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Course Outcome: The students will be able to:

1. Design, formulate, and construct applications with VB.NET
2. Assemble multiple forms, modules, and menus into working VB.NET solutions
3. Create VB.NET programs using multiple array techniques
4. Build integrated VB.NET solutions using list, loop, files and structures with printing capabilities
5. Separate operations into appropriate VB.NET procedures and functions

References:

1. Microsoft Office 2007 fundamentals, L. Story, D Wall
2. MS Office, 5.3 Shriters, Firewall Media
3. Office 2000 made easy, Alan Neiber, Tata McGraw Hill
4. FLASHMX Bible, Rat Reinhart
5. Sams Teach Yourself Macromedia Flash8 in 24 Hours, Phillip Kerman
6. How do everything with Macromedia, Boele Hake, Dougsahlin
7. Multimedia Making it works, Tay Vaughan, Tata McGraw Hill

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Department of Computer ApplicationAcademic Year

2022-23

BCA Third Year

Name of the Program: **BCA**		Program Code: BCA III
Name of the Course: **Software Engineering**		Max Marks: **100**
Course Code: **BCA 304**	Total Duration- 95 Hr	(Internal:20 External :80)

Course Objective: Students will learn about subject and its usage in software engineeringsuch as

1. To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
2. To provide an idea of using various process models in the software industry according to given circumstances.
3. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

Syllabus

Unit	Topic	Duration (In Hours)	Marks
1	Definition of software product	20	16
	Software Paradigms		
	Software Engineering		
	Knowledge Engineering and end user development approach		
	Abstract		
	Partitioning and projection		
	System Specification		
	Software Requirement Specification (SRS)		
	Formal Specification method		
	Specification Tools		
	Flow based data based and object-oriented analysis.		
2	**System Design:** Idealized and constrained design	20	16
	Process oriented design (Game and Sarson and Yourdon notations)		
	Data Oriented Design (Warnier – (Orr, E-r modeling)		
	Object oriented design (Booch approach)		
	Cohesion and coupling		
	Design metrics		
	Design documentation standards.		
3	**Role Of Case Tools:** Relevance of Case tools	22	16
	High – end and low – end case tools		

	Automated support for data dictionaries		
	Data flow diagrams		
	Entity relationship diagrams		
	Coding And Programming: Choice of programming languages		
	Mixed language programming and call semantics		
	Re- engineering legacy systems		
	Coding standard		
4	**Software Quality and Testing:** Software quality assurance	18	16
	Types of Software Testing (White Box, Black Box, Unit, Integration,		
	Validation, System etc.		
	Debugging and reliability analysis		
	Program complexity analysis		
	Software Quality and metrics		
	Software maturity model and extensions		
	Software cost and Time estimation.		
	Function points		
	Issue in software cost estimation		
	Introduction to Rayleigh curve3		
	Algorithm cost model (COCOMO, Putnam – slim,		
	Watson and Felix		
	Software Project Management: Planning software projects		
	Work Background Structures		
	Integration software		
5	Software Design and Project Planning	15	16
	Software Project Teams		
	Project Monitoring and Controls		

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Course Outcome: Students will be able to

1. Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
2. Choose appropriate process model depending on the user requirements.
3. Decompose the given project in various phases of a lifecycle. Knowledge, Understand
4. Apply the knowledge, techniques, and skills in the development of a software product.

References:

1. Software Engineering: A Practitioner's Approach – by Essman Roger, Tata McGraw Hill.
2. An Integrated approach to Software Engineering – by Jalote Pankal, Narosa: New Delhi

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Department of Computer ApplicationAcademic Year

2021-22

BCA Final Year

Name of the Program: **BCA**		Program Code: **BCA III**
Name of the Course: DATA STRUCTURE		Max Marks: **100**
Course Code: **BCA 305**	Total Duration- 110 Hr	(Internal:**20** + External: **80**)

Course Objective:

1. To impart the basic concepts of data structures and algorithms
2. To understand concepts about searching and sorting techniques
3. To Understand basic concepts about stacks, queues, lists, trees and graphs
4. To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

Syllabus

Unit	Topic	Duration (In Hours)	Marks
1	Introduction, Basic terminology, Elementary data organization,	20	16
	Data structure, Data structure operation,		
	Algorithms: complexity, time-space Tradeoff.		
	Mathematical Notation and functions,		
	Algorithmic Notation		
2	Concepts Of Arrays, Records and Pointers-	20	16
	Basic Terminology, Linear Array;		
	Single Dimensional Array, Multidimensional Array		
	Static Array, Dynamic Array; Pointers:		
3	Linked Lists, Stacks, Queues, Recursion	20	16
	Link lists, Traversing a linked list,		
	Searching a linked list; Insertion into a linked List,		
	Deletion from a Linked List,		
	Stacks.		
	Array Representation of Stack; Queues.		
4	Representing Binary Trees in Memory,	25	16
	Traversing binary tree		
	Traversal Algorithms using stacks,		

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	header nodes; threads, Binary Search Tree,		
	Searching and Inserting in Binary Search Tree,		
	Deleting in Binary Search tree		
5	Sorting: Bubble Sort, Quick Sort, Insertion Sort, Selection Sort, Merge Sort	25	16
	Searching: Liner Search,		
	Binary Search, Searching		
	Data modification, Introduction to hashing.		

Course Outcome: students will be able to

1. Analyze algorithms and algorithm correctness.
2. summarize searching and sorting techniques
3. Describe stack, queue and linked list operation.
4. Have knowledge of tree and graphs concepts.

References:

1. Data Structure -Seymour Lipschutz (Schaum's Series). -
2. Data Structure & Program Design -Robert L. Kruse, 3rd Ed., Prentice Hall.

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Department of Computer ApplicationAcademic Year

2021-22

BCA Final Year

Name of the Program: **BCA**		Program Code: **BCA III**
Name of the Course: **Computer System Architecture**		Max Marks: **100**
Course Code: **BCA 306**	Total Duration- 105 Hr	(Internal:**20** + External: **80**)

Course Objective:

1. Basic concepts of architecture of central processing unit
2. Discuss the structure of computers and design issues.
3. Understand concepts of register transfer logic and arithmetic operations.
4. Explain different types of addressing modes and memory organization.
5. Learn the different types of serial communication techniques.

Unit	Topic	Duration (In Hours)	Marks
1	Data Representation-Data Types Number System Fixed Point Representation-1's. 2's complements. Binary Fixed-point representation, Arithmetic operation on Binary operation, Overflow & Underflow Codes ASCII, EBCDIC codes Grey codes, Excess-3. BCD codes. Error detection & correcting codes	20	16
2	Digital Logic Circuits-Logic Gates AND. OR, NOT, Gates & their truth tables, NOR, NAND & XOR Gates Boolean algebra, Basic Boolean Law, Doorman's theorem, Map Simplification, Minimizing Technique. K Map Sum of product. Product of sums, Combinational & sequential Circuits Half adder & Full adder. Full Subtractor. Flip Flop-RS, D, JK & T Flip Flop, Shift register, RAM & ROM	25	16
3	CPU organization,	20	16

	ALU & Control circuit, Idea about arithmetic circuits		
	Program control, Instruction Sequencing,		
	Introduction to Microprocessor. Microprocessor architecture.		
	System buses, Registers, Program counter Block diagram of a Macro computer system,		
	Microprocessor control signals,		
	Interfacing Devices Introduction to Motherboard SMPS		
4	Input output organization,	20	16
	I/O Interface, Properties of simple I/O devices and their Controller		
	Isolated versus Memory mapped 1O,		
	Modes of Data transfer,		
	Synchronous & Asynchronous Data Transfer.		
	Handshaking, Asynchronous serial transfer.		
	I/O processor.		
5	Auxiliary memory-Magnetic drum,	20	16
	Disk & Tape,		
	Semiconductor memories, Memory Hierarchy,		
	Associative memory, Virtual memory,		
	Address space & memory space, Address mapping,		
	Page table, Page placement, cache memory		
	Hit ratio, Mapping Techniques, Writing into cache		

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Course Outcome: Students will be able to

1. Understand the theory and architecture of central processing unit.
2. Analyze some of the design issues in terms of speed, technology, cost, performance.
3. Understand register transfer logic and arithmetic operations
4. Use appropriate tools to design verify and test the CPU architecture and understand the addressing mode.
5. Learn the concepts of serial and parallel processing, pipelining and interprocessor communication.

References:

1. M. Moris Mano, "Computer Systems Architecture", 4th Edition, Pearson/PHI,
2. John L. Hennessy and David A. Patterson, "Computer Architecture a quantitative approach", 4th Edition Elsevier, ISBN:10:0123704901
3. A. Anandkumar, "Fundamentals of digital circuits", 4th edition, PHI