(Annexure D-1_BCA3to6)

FACULTY OF COMPUTER SCIENCE & IT

SYLLABUS

of

Bachelor of Computer Applications

(Semester III-VI)

(Under Continuous Evaluation System)

(12+3 System of Education)

Batch: 2022-25
Session: 2023-24

The Heritage Institution

KANYA MAHA VIDYALAYA JALANDHAR (Autonomous)

PROGRAMME SPECIFIC OUTCOMES

Bachelor of Computer Applications
(Session 2023-24)

Program Specific Outcomes

PSO1: Apply skills for development of software and websites for providing efficient solution to IT based problems

PSO2: Comprehend development process in IT industry through ethical, defined and innovative techniques.

PS03: Achieve leadership role and team player role to be able to work in multidisciplinary areas at various job roles.

PSO4: Identify and demonstrate the implementation of various tools and technologies involved in the field of Information Technology.

PSO5: Demonstrate proficiency in the field of Programming, Web development and IT enabled services.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Computer Applications

Session 2023-24

Bachelor of Computer Applications Semester- III							
Course Code	**Course Name**	**Course Type**	**Marks**				**Examination Time (in Hours)**
			Total	**Ext.**		**CA**	
				L	**P**		
BCAL-3111	Foundation of Data Science	C	75	60	-	15	3
BCAL-3112	Database Management System	C	75	60	-	15	3
BCAL-3113	Computational Problem Solving	C	75	60	-	15	3
BCAP-3114	Lab on Computational Problem Solving	C	50	-	40	10	3
BCAP-3115	Lab on Database Management System	C	25	-	20	5	3
AECE - 3221	* Environmental Studies (Compulsory)	AC	100	60	20	20	3
SECP - 3512	* Personality Development	AC	25	20	-	05	1
	Total		300				

Note:

C - Compulsory

AC - Audit Course

*** Marks of these courses will not be added in total marks and only grades will be provided.**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Computer Applications

Session 2023-24

Bachelor of Computer Applications Semester- IV							
Course Code	**Course Name**	**Course Type**	**Marks**				**Examination Time (in Hours)**
			Total	**Ext.**		**CA**	
				L	**P**		
BCAL-4111	Data Structures	C	75	60	-	15	3
BCAL-4112	Information Systems	C	75	60	-	15	3
BCAL-4113	Internet Applications	C	75	60	-	15	3
BCAL-4114	Computer Architecture	C	75	60	-	15	3
BCAP-4115	Lab on Data Structures	C	50	-	40	10	3
BCAP-4116	Lab on Internet Applications	C	50	-	40	10	3
SECS - 4522	* Social Outreach	AC	25	-	20	05	1
	Total		400				

Note:

C - Compulsory

AC - Audit Course

*** Marks of these courses will not be added in total marks and only grades will be provided.**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Computer Applications

Session 2023-24

Bachelor of Computer Applications Semester - V							
Course Code	**Course Name**	**Course Type**	**Marks**				**Examination Time (in Hours)**
			Total	**Ext.**		**CA**	
				L	**P**		
BCAL-5111	Computer Networks	C	75	60	-	15	3
BCAL-5112	Web Technologies (Full Stack Development)	C	75	60	-	15	3
BCAL-5113	Operating System	C	75	60	-	15	3
BCAL-5114	Object Oriented Programming -II	C	75	60	-	15	3
BCAP-5115	Lab on Object Oriented Programming- II	C	50	-	40	10	3
BCAP-5116	Lab on Full Stack Development	C	50	-	40	10	3
SECJ-5551	* Job Readiness Course	AC	25	20	-	5	1
	Total		400				

Note:

C-Compulsory

AC - Audit Course

*** Marks of these courses will not be added in total marks and only grades will be provided**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Computer Applications

Session 2023-24

Bachelor of Computer Applications Semester - VI							
Course Code	**Course Name**	**Course Type**	**Marks**				**Examination Time (in Hours)**
			Total	**Ext.**		**CA**	
				L	**P**		
BCAL-6111	Computer Graphics	C	75	60	-	15	3
BCAL-6112	Software Engineering	C	75	60	-	15	3
BCAP-6113	Lab on Computer Graphics	C	50	-	40	10	3
BCAD-6114	Project	C	300	-	240	60	3
	Total		500				

Note:
C-Compulsory

Bachelor of Computer Applications Semester – III
(Session 2023-24)
COURSE CODE: BCAL-3111
FOUNDATION OF DATA SCIENCE

Course Outcomes:

After passing course the student will be able to:

CO1: Comprehend basic concepts of Data Science along with its components and process.

CO2: Interpret various data collection tools.

CO3: Analyze different application areas and challenges of data science.

CO4: Work with Power BI for visualization of data.

Bachelor of Computer Applications Semester – III
(Session 2023-24)
COURSE CODE: BCAL-3111
FOUNDATION OF DATA SCIENCE

Examination Time: 3 Hours

Max. Marks: 75
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Introduction to Data Science: Meaning, Evolution, Need and Components of Data Science, Data Science Process. Difference between Data Science and Business Intelligence.

Understanding Data Analytics: Need, Characteristics – Four Vs.

UNIT- II

Data Collection: Data Collection sources, Data collection methods – Primary data collection methods – Interviews, Questionnaires and Secondary data collection methods. Data collection Tools – online and offline.

Types of Data Analytics: Descriptive. Predictive, Diagnostic, Prescriptive.

UNIT-III

Domain Data Analysis: Exploratory and Confirmatory data analysis

Application Areas and Challenges in Data Science. Technical Skills of a data Analyst.

Job Roles in Data Science.

UNIT-IV

Data Storytelling: Benefits and Best Practices, data visualization.

Introduction to Power BI: Need, Features, Components, Architecture and Services. Creating a Sample dashboard.

References / Textbooks:

1. Qurban A Memon, Shakeel Ahmed, Data Science: Theory, Analysis and Applications, CRC Press (2019), 1st edition.
2. Ulrika Jagare, Data Science for Dummies, Wiley (2019)
3. Joel Grus, Data Science from Scratch, O'Reilly (2015), 1st Edition
4. Pulkit Bansal, Data Science Uncovering the Reality, Notion Press (2020), 1st Edition
5. Davy Cielen, Arno D.B.Meysman, Mohamed Ali, Introducing Data Science: Big Data, Machine Learning, Dreamtech Press (2016)
6. Roger Peng, Elizabeth Matsui, The Art of Data Science, Lulu.com (2016)
7. Ramesh Sharda, DursunDelen and Efraim Turban, Business Intelligence, Analytics and Data Science: A Managerial Perspective, Pearson Education (2019), 4th Edition
8. Reza Rad, Basics of Power BI Modeling, Radacad Publications (September (2020)), Ist Edition
9. Reza Rad, Leila Etaati, Getting started with Power Query in Power BI and Excel, Radacad Publishers, Edition One.

Bachelor of Computer Applications Semester – III
(Session 2023-24)
COURSE CODE: BCAL–3112
DATABASE MANAGEMENT SYSTEM

Course Outcomes:
After passing course the student will be able to:

CO1: Understand data, database and database models.

CO2: Apply relational algebra and relational calculus for performing queries of different types.

CO3: Gain knowledge of normalization and transaction control.

CO4: Create, manage and access database using SQL and PL/SQL.

Bachelor of Computer Applications Semester – III
(Session 2023-24)
COURSE CODE: BCAL–3112
DATABASE MANAGEMENT SYSTEM

Max. Marks: 75
Theory: 60
CA: 15

Examination Time:3 Hours

Instructions for Paper Setter -

Eight questions of equal marks (12 Marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Introduction: Introduction to Data, Field, Record, File, Database, Database management system. Structure of database system, Advantages and Disadvantages, levels of database system, Relational model, Hierarchical model, Network model, comparison of models, E-R diagram, different keys used in a relational system, DBA, responsibilities of DBA.

UNIT-II

Codd's Rules, Relational Algebra, Relational Calculus - Domain and Tuple relational calculus, Query Processing and Optimization.

UNIT-III

Introduction to normalization – need and advantages of normalization, INF, 2NF, 3NF, BCNF, 4NF and 5NF, Introduction to transaction management – ACID Properties, concurrency control and its management, protection, security, recovery of database.

UNIT-IV

SQL: Introduction to SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Built in Functions, Views, Security amongst users, sequences, Indexing,
Introduction to PL/SQL: Cursors – Implicit and Explicit, Procedures, Functions, Packages, Database Triggers.
Big Data: Introduction to Big Data and Analytics, Introduction to NoSQL.

References/Textbooks:

1. C.J. Date, An Introduction to Database Systems, Pearson Education 2000.
2. H. F. Korth & Silverschatz, A., Database System Concepts, Tata McGraw Hill, 2010.
3. Elmasri & Navathe, Fundamentals of Database Systems, Addison-Wesley, 2011.

4. Hoffer, Prescott, Mcfadden, Modern Database Management, Paperback International, 2012.
5. Martin Gruber, Understanding SQL, BPB Publication, 1994.
6. Shashank Tiwari, Professional NOSQL, Wiley, 2015.

Note: The latest editions of the books should be followed.

Bachelor of Computer Applications Semester – III
(Session 2023-24)
COURSE CODE:BCAL–3113
COMPUTATIONAL PROBLEM SOLVING

Course Outcomes:

After passing course the student will be able to:

CO1: Comprehend basics of Python programming like operators, data types, control structures, etc.

CO2: Apply list and directories for handling and accessing data through iterations.

CO3: Implement various built-in and user defined function to solve mathematical problems.

CO4: Comprehend Object Oriented Programming and modules in Python.

Bachelor of Computer Applications Semester – III
(Session 2023-24)
COURSE CODE: BCAL–3113
COMPUTATIONAL PROBLEM SOLVING

Max. Marks: 75
Theory: 60
CA: 15

Examination Time:3 Hours

Instructions for Paper Setter -

Eight questions of equal marks(12 Marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Introduction to Python: Process of Computational Problem Solving, Python Programming Language

Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types

Control Structures: Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

UNIT-II

Lists: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python
Dictionaries: Dictionaries and Files, Looping and dictionaries, advanced text parsing
Iteration: While statement, definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

UNIT-III

Functions: Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments
Files: Opening Files, Using Text Files, String Processing, Exception Handling

UNIT-IV

Objects and Their Use: Introduction to Object Oriented Programming
Modular Design: Modules, Top-Down Design, Python Modules
Using Databases and SQL: Database Concepts, SQLite Manager Firefox Add-on, SQL basics summary, basic Data Modeling, Programming with multiple tables.

References/Textbooks:

1. Charles Severance, Python for Informatics, Version 0.0.7.
2. Charles Dierbach, Introduction to Computer Science Using Python: A Computational Problem-SolvingFocus, Wiley Publications, 2012.
3. Guttag John V, Introduction To Computation And Programming Using Python, PHI, 2014.
4. Jeeva Jose and Sojan P. Lal, Introduction to Computating& Problem Solving Through Python, Khanna Publishers, 2015.
5. Mark J. Guzdial, Introduction to Computing and Programming in Python, PearsonEducation, 2015.
6. Kenneth Lambert, Fundamentals of Python, Course Technology, Cengage Learning, 2015
7. Mark Lutz, Learning Python, O'Reilly Media, 2013

Note: The latest editions of the books should be followed.

Bachelor of Computer Applications Semester – III
(Session 2023-24)
COURSE CODE:BCAP–3114
LAB ON COMPUTATIONAL PROBLEM SOLVING

Max. Marks: 50
Practical: 40
CA: 10

Examination Time:3 Hours

Lab based on computational problem solving**.**

Bachelor of Computer Applications Semester – III
(Session 2023-24)
COURSE CODE: BCAP–3115
LABON DATABASE MANAGEMENT SYSTEM

Max. Marks: 25
Practical: 20
CA: 5

Examination Time:3 Hours

Lab based on Database Management System.

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAL–4111
DATA STRUCTURES

Course Outcomes:

After passing course the student will be able to:

CO1: Analyze complexity of algorithms to determine their efficiency.

CO2: Comprehend various hashing method, sorting and searching algorithms.

CO3: Comprehend various operations of stack and queue along with different scenarios.

CO4: Comprehend advanced data structures such as tree and graph.

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAL–4111
DATA STRUCTURES

Examination Time: 3 Hours

Max. Marks: 75
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Data Structure: Introduction, Common Operations on Data Structures, Algorithm Complexity, Big O Notation, Time – Space tradeoff between Algorithms.

Arrays: Array Defined, Representing Arrays in Memory, Operations, Bubble Sort, Linear Search, Binary Search and Multidimensional Arrays.

UNIT-II

Hashing: Hash Functions: Division Method, Mid-Square Method & Folding Method and Collision Resolution methods.

Linked Lists: Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.

UNIT-III

Stacks: Description of STACK structure, Implementation of Stack in memory, Applications of Stacks – Converting Arithmetic expression from infix notation to reverse polish and their subsequent evaluation and Quicksort method.

Queues: Description of queue structure, Implementation of queue in memory, Description of priorities of queues, Dequeues.

UNIT-IV

Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory and Heapsort.

Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, PathMatrix and Graph traversal techniques - DFS, BFS.

References / Textbooks:

1. Seymour Lipschutz, Data Structures with C (Schaum's Outline Series), McGraw Hill Education (2017), 1st Edition
2. Reema Thareja, Data Structures Using C, Oxford Publication (2014), 2nd Edition
3. Sahni Horowitz, Fundamentals of Data Strucetures in C (2008), 2nd Edition
4. Narasimha Karumanchi, Data Structures and Algorithms made easy, Careermonk Publications (2016), 5th Edition
5. S.K. Srivastava and Deepali Srivastava, Data Structures through C, BPB Publications (2004)
6. YedidyahLangsam, Augestein and Tanenbaum, Data Structures using C and C++, Pearson Education India (2015), 2nd Edition

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAL–4112
INFORMATION SYSTEMS

Course Outcomes:

After passing course the student will be able to:

CO1: Identify the importance of data and information management.

CO2: Comprehend development life cycle of information systems.

CO3: Identify the components and applications of Management Information System and Decision Support System.

CO4: Identify the role of Information System in organizations: Accounting Information systems, Inventory control systems and Marketing systems.

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAL–4112
INFORMATION SYSTEMS

Examination Time: 3 Hours

Max. Marks: 75
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT - I

Basic Concepts: Systems, Data, Information, Knowledge, Database Management System. Information needs of business, Sources of information – Primary and Secondary. Online access and capture.

UNIT - II

Information System: Introduction to System, types of Systems, Information System and its types.

Planning Information systems: System Development Life Cycle and Rapid Application Development. Types of Decisions - Structured, Unstructured and Semi Structured.

UNIT - III

Management Information System: Need, Components and Functions of MIS. Planning of MIS, Implementation and Controlling MIS.

Decision Support System: Meaning, Characteristics, Types and Components of DSS.

UNIT - IV

Transaction Processing Systems: Meaning, Characteristics, Components of TPS. Difference between MIS, DSS and TPS.

Case studies of the Information System: Accounting Information systems, Inventory control systems & Marketing systems.

References / Textbooks:

1. Mohammad Azam, Management Information Systems, Tata McGraw Hill Education (2012).
2. Nagpal D.P., Textbook on Management Information System, S.Chand& Company (2011).
3. R. Kelly, Rainer and Casey G. Cegielski, Introduction to Information Systems, Wiley (2015), 4th Edition
4. C. Laudon Kenneth and P. Laudon Jane, Management Information System, Pearson Education (2018), 15th Edition.
5. Brien, Marakas and Behl, Management Information Systems, McGraw Hill Education (2017), 10th Edition
6. Suman Mann SeemaShokeen, Pooja Singh, Information Systems, Dreamtech Press (2020)

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAL-4113
INTERNET APPLICATIONS

Course Outcomes:

After passing course the student will be able to:

CO1: Comprehend basics of internet and email along with their effective use.

CO2: Apply HTML for development of static webpages.

CO3: Implement styling and behavior in webpages through the use of CSS.

CO4: Create and manage websites through the application of WordPress content management system.

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAL-4113
INTERNET APPLICATIONS

Examination Time: 3 Hours

Max. Marks: 75
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Internet: Introduction, working, applications, DNS, IP addresses, Search engine and its working. File Transfer Protocol (FTP), Telnet, HTTP, WWW and its working.

E–Mail Basics: Introduction, Advantage and disadvantage, Protocols and structure of an e–mail message, working of e–mail (sending and receiving messages).

UNIT-II

HTML: Introduction, Features, Program Structure, Headings, Paragraph, Styling, Formatting, Hyperlink, Image, Table, List, Frame, Block, Entities, Form, Form elements, Audio, Video, Embed YouTube Video.

UNIT-III

CSS: Introduction, Advantages and Limitations, types, selector, colors, background, box model, text, font, display, position, z-index, float, clear, rounded corners, 2D Transformations, Transitions and Animations.

UNIT-IV

WordPress: Installation, Configuration, Management - Managing Posts, comments, pages, categories, Plugins, Widgets, Tags, images, users, Import and export content, Updating WordPress. Useful Plugins – MailChimp, Creating Gallery, Stripe Checkout, Verified Authorship, Google Maps, Google Analytics.

References / Textbooks:

1. Anshuman Sharma, Fundamentals of Internaet Applications, Lakhanpal Publications, 2016.
2. Ikvinderpal Singh, Internet Applications, Khanna Book Publishing Company, 1st Edition, 2011
3. P. Rizwan Ahmed, Internet & its Applications, Margham Publications, 2013.
4. Douglas E. Corner, Computer Networks and Internet with Internet Applications, Pearson, 4th Edition, 2008.
5. Satish Jain/Vineeta Pillai, Wireless Communication & Networking made Simple, BPB Publishers, 2007.
6. Laura Lerney, Rafe Colburn, Jennifer Kyrnin, Mastering HTML, CSS & Javascript Web Publishing, BPB Publishers, 1st Edition, 2016.
7. Lisa Sabin-Wilson, WordPress for Dummies, Wiley, 8th Edition, 2021.

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAL–4114
COMPUTER ARCHITECTURE

Course Outcomes:
After passing course the student will be able to:

CO1: Comprehend various registers and its micro-operations, computer instructions and basic design of computer.

CO2: Comprehend various instruction formats and addressing modes.

CO3: Identify the hierarchy of computer memory and their organization.

CO4: Comprehend I/O organization, Pipeline and vector processing.

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAL–4114
COMPUTER ARCHITECTURE

Max. Marks: 75
Theory: 60
CA: 15

Examination Time: 3 Hours

Instructions for Paper Setter -

Eight questions of equal marks (12 Marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Information Representation: Register Transfer, Various Registers, Implementing Common Bus Using Multiplexers: Logical; Arithmetic & Shift Micro-operations.

Basic Computer Design Instruction Codes, Interfacing various Registers, Computer Instructions, Timing Signals, Instruction Cycle, Design of a Basic Computer.

UNIT-II

CPU Design Stack Organized CPU, Instruction Formats, Addressing Modes, Program Control, Hardwired & Microprogrammed (Wilhe's Design) Control Unit.

UNIT-III

Memory Organization Memory Hierarchy, Designs & Concepts of Main Memory, Auxiliary Memory, Associative Memory, Cache and Virtual Memory.

UNIT-IV

I/O Organization I/O Interface, Modes of Transfer, Program Interrupt, DMA & I/O Processor.

Pipeline & Vector Processing Parallel Processing Pipelining, Parallel & Distributed Computers, SISD, SIMD& MISD, MIMD Machines, Vector Processing.

References/Textbooks:

1. Morris M. Mano, Computer System Architecture, Prentice Hall, 1992.
2. J.P. Hayes, Computer Architecture and Organization, McGraw Hill, 1998.
3. J.L. Hennessy D.A Patterson, and D. Goldberg, Computer Architecture A Quantitative Approach, Pearson Education Asia, 2006.

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAP–4115
LAB ON DATA STRUCTURES

Examination Time: 3 Hours

Max. Marks: 50
Practical: 40
CA: 10

Lab based on Data Structures .

Bachelor of Computer Applications Semester – IV
(Session 2023-24)
COURSE CODE: BCAP–4116
LAB ON INTERNET APPLICATIONS

Examination Time: 3 Hours

Max. Marks: 50
Practical: 40
CA: 10

Lab Based on Use of Internet and Web Designing.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAL-5111
COMPUTER NETWORKS

Course Outcomes:
After passing course the student will be able to:

CO1: Describe the functions of each layer in OSI and TCP/IP model.

CO2: Identify various network devices and the layers on which it operates.

CO3: Describe the Data Link layer and Network layer design issues.

CO4: Comprehend the functioning of Transport layer and Application layer protocols.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAL-5111
COMPUTER NETWORKS

Examination Time: 3 Hours

Max. Marks: 75
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks(12 Marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT – I

Introduction: Basic concepts of Computer Networks, Basic Components of a Network, Network types and topologies.

Models: OSI Reference Model, TCP/IP Model, Comparison between TCP/IP and OSI model

Transmission Media: Coaxial Cable, Twisted Pair Cable, Fiber Optics & Satellites.

UNIT – II

Network Devices: Hub, Switch, Repeaters, Bridges, Routers, Gateways.

Introduction to Analog and Digital Transmission: Introduction to Analog and Digital Signals, Modems, Types of modems, pulse code modulation. Multiplexing and its types, Circuit Switching, Packet Switching, Message Switching.

Data Link Layer Design Issues: Error Control, Flow Control, Error Detection & Correction

UNIT - III

Media Access Protocols: CSMA, CSMA/CD, CSMA/CA.

IEEE standards 802: Token Ring, FDDI.

Design Issues of Network Layer: Routing Algorithm- Distance Vector Routing, Link state Routing and The Dijkstra Algorithm, IPv4: Notation, Classful addressing, Header Format, IPv6 addressing.

UNIT – IV

Design issues of Transport Layer: Introduction to TCP, TCP Services, features, TCP segment format, Introduction to UDP, User Datagram Format, UDP Operation
Network Security and Privacy: Introduction to Cryptography, types of Key.

References/Textbooks:

1. Tanenbaum , A.S., Computer Networks, Prentice Hall, 2010.
2. Stallings, W., Local Networks: An Introduction: Macmillan Publishing Co, 1990.
3. Stallings W., Data and Computer Communications, Prentice Hall, 2011.
4. Forouzan B., Data Communications and networking, McGraw Hill, 2007.

Note: The latest editions of the books should be followed.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAL-5112
WEB TECHNOLOGIES (FULL STACK DEVELOPMENT)

Course Outcomes:
After passing course the student will be able to:

CO1: Apply JavaScript code for interaction with content of webpage.

CO2: Develop user interface of single page website through React.

CO3: Implement Node.js code for back-end support and database connectivity with MongoDB.

CO4: Implement Express code for managing HTTP responses, sessions, forms and database connectivity.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAL-5112
WEB TECHNOLOGIES (FULL STACK DEVELOPMENT)

Examination Time: 3 Hours

Max. Marks: 75
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 Marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

JavaScript: Introduction to JavaScript, Features, Data types (Number, Strings, Boolean, Objects), Operators (Arithmetic, Assignment, Comparison, Logical), Functions, Looping Statement (For loop, While loop), Conditional Statement, Arrays, JavaScript objects, Host objects.

DOM: Introduction, Methods, Accessing HTML and CSS, Events, Event Listener, Nodes and Collection.

BOM: Window, Screen, History, Navigation.

ES6: Variables, Arrow functions, Class.

UNIT-II

React: Introduction, Features, Render HTML, JSX.

React Components: Class, Function, Constructor, Nested Component, Lifecycle of React Components

Data Handling: Props, Form and Event Handling in React, Fetching Data through API.

UNIT-III

Node: Introduction to Node, Modules -NPM, HTTP and URL Module.

Node File System, User Authentication, Event Handling, File Upload, Email Handling. Using MongoDB with Node.

UNIT-IV

Express: Introduction, Working with HTTP methods (GET and POST), Routing, URL Building, and Templating.

Express Middleware: Application-level, Router-level, Error-Handling, Built-in, Third Party. Managing Cookies and Sessions, Connecting with MongoDB.

References / Textbooks:

1. Jeffery C Jackson, "Web Technology- A Computer Science perspective", Pearson Education, 1st Edition, 2007.
2. Chris Bates, "Web Programming- Building Internet Applications", Wiley India, 1st Edition, 2006.
3. Achyut S Godbole and Atul Kahate, "Web technologies", Tata McGraw Hill, 1st Edition, 2008.
4. Web Technologies, Uttam K Roy, Oxford University Press, 1st Edition, 2010.
5. Kirupa Chinnathambi, Learning React, Addison-Wesley Professional, 1st Edition, 2019.

Note: The latest editions of the books should be followed.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAL - 5113
OPERATING SYSTEM

Course Outcomes:
After passing course the student will be able to:

CO1: Describe, contrast and compare different types of Operating System.

CO2: Understand the process synchronization policies and CPU scheduling.

CO3: Describe and analyze the memory management and its allocation policies.

CO4: Comprehend about the application of virtual memory and disk scheduling.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAL-5113
OPEARTING SYSTEM

Examination Time: 3 Hours

Max. Marks: 75
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks(12 Marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT – I

Introduction: Definition, Batch Processing, Multi programming, Time Sharing Systems, Multitasking, multiprocessing, Parallel Systems, Distributed Systems, Real–time Systems.

Processes: Process Concepts, Process Scheduling, Threads, System Calls.

UNIT - II

CPU–Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm Evaluation: Response Time, Turnaround Time, Waiting Time, Throughput.

Process Synchronization: Critical-section problem, semaphores and its Types (Binary and Counting), Classical problems of synchronization and their solutions.

UNIT – III

Deadlocks: System Model, Deadlock characterization, Methods for handing deadlocks, Deadlocks Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Approach to Deadlock handling.

Memory Management: Background, Logical v/s Physical Address Space, Swapping, Continuous Allocation, Paging, Segmentation.

UNIT – IV

Virtual Memory: Background, Page Fault, Demand Paging, Page Replacement, Page Replacement Algorithms, Thrashing.

Secondary Storage Structures: Disk structures, Disk scheduling.

References/Textbooks:

1. AviSilberschatz, Peter Baer Galvin, Greg Gagne, Operating System Concepts, Wiley, 2013.
2. Charles Crowley, Operating Systems: A Design-Oriented Approach, Tata McGraw Hill, 2001.
3. Deitel, An Introduction to Operating Systems, Second Edition, Addison Wesley, 1990.
4. William Stallings, Operating Systems: Internals and Design Principles, Pearson Education Limited, 2014.

Note: The latest editions of the books should be followed.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAL-5114
OBJECT ORIENTED PROGRAMMING-II

Course Outcomes:
After passing this course the student will be able to:

CO1: Understand the basic fundamentals of Object Oriented Programming using Java.

CO2: Identify the use of inheritance, interfaces and packages in Java.

CO3: Identify the utilization of multithreading and Exception handling.

CO4: Connect Java application with an existing database and access it through JDBC.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAL-5114
OBJECT ORIENTED PROGRAMMING-II

Max. Marks: 75
Examination Time: 3 Hours **Theory: 60**
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 Marks each)are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT - I

JAVA BASICS: Introduction to Java, Features of Java, Structure of a Java Program, primitive data types, keywords, Identifiers, literals, operators and comments.

OOPS: Object oriented concepts Advantage of OOPs, Objects and Classes,

Strings: Declaring a string, Immutable string, string comparison, concatenation, substring, string tokenizer.

UNIT - II

Inheritance: what is inheritance, types of inheritance, static import, Method overloading, method overriding, Runtime polymorphism, super keyword, final keyword

Interfaces: Abstract classes, declaring an interface, relationship between classes and interface, interface inheritance, implementing multiple inheritance using interface

Packages: what are packages, advantages of using packages, accessing package from another package, subpackaging, running packages by setting path and classpath.

UNIT - III

Exception Handling: what is exception handling, checked and unchecked exceptions, try-catch, try-multiple catch, try – finally, throw and throws

Multithreading: What is a thread, life cycle of a thread, creating a thread, sleeping a thread, joining a thread, thread priority

UNIT - IV

Input/Output: File input stream, File output stream, Buffered output stream, Buffered input stream.

Database connectivity: JDBC, JDBC drivers, steps to connect to the database, connectivity with MYSQL.

References/Textbooks:

1. HurbertSchildt, Java The Complete Reference, Tata McGraw Hill, 2014.
2. Y. Daniel Liang, Introduction to Java Programming, Pearsons Publications, 2015.
3. Jon Duckett, Beginning Web Programming with HTML, XHTML, and CSS, John Wiley & Sons, 2004.
4. Thomas A. Powell, HTML & CSS: The Complete Reference, McGraw-Hill, 2010.

Note: The latest editions of the books should be followed.

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAP-5115
LAB ON OBJECT ORIENTED PROGRAMMING-II

Examination Time: 3 Hours

Max. Marks: 50
Practical: 40
CA: 10

Lab Based on Object Oriented Programming - II

Bachelor of Computer Applications Semester – V
(Session 2023-24)
COURSE CODE: BCAP-5116
LAB ON FULL STACK DEVELOPMENT

Examination Time: 3 Hours

Max. Marks: 50
Practical: 40
CA: 10

Lab Based on Web Technologies.

Bachelor of Computer Applications Semester – VI
(Session 2023-24)
COURSE CODE: BCAL - 6111
COMPUTER GRAPHICS

COMPUTER GRAPHICS

Course Outcomes:

After passing this course the student will be able to:

CO1: Comprehend the background mechanism involved in display devices like CRT, LCD, LED, etc.

CO2: Comprehend basic concepts involved in drawing basic shapes.

CO3: Implement various algorithms and techniques to clip and transform various objects and viewports.

CO4: Identify the importance of viewing and projections.

Bachelor of Computer Applications Semester – VI
(Session 2023-24)
COURSE CODE: BCAL - 6111
COMPUTER GRAPHICS

Examination Time: 3 Hours **Max. Marks: 75**
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT – I

Overview of Graphics System: Computer Graphics and their applications.

Display Devices: CRT Monitors, Random Scan, Raster Scan, LED & LCD Monitors, Virtual Reality and Workstation.

UNIT – II

Elementary Drawing: Points and various line drawing Algorithms and their comparisons and Circle & Ellipse Generating Algorithms.

UNIT – III

Two Dimensional Transformations: Basic Transformations - Translation, Rotation, Scaling, Reflection and Shearing. Matrix representation of Basic Transformations, Homogenous Coordinates and Composite transformations.

Windowing and Clipping: Windowing Concepts, Clipping and its Algorithms and Window–to–View Port Transformations.

UNIT - IV

Three Dimensional concepts: 3D Coordinate Systems, 3D Transformations - Translation, Rotation, Scaling, Reflection and Shearing,

Projection: Parallel Projections, Perspective Projection, Vanishing Point, View Confusion and Topological Distortion.

References / Textbooks:

1. Hearn D, Baker P, Computer Graphics, PHI Easter Economy (2002), 2nd Edition.

2. Zhigang Xiang, Plastock R, Kalley G, Computer Graphics, McGraw Hill Education (2006), 2nd Edition.
3. Rajesh K. Maurya, Computer Graphics with Virtual Reality System, Wiley (2018), 3rd Edition
4. Udit Aggarwal, Computer Graphics, SK Katria and Sons (2013), Reprint 2013 Edition
5. Pardeep K. Bhatia, Computer Graphics, Dreamtech Press (2019)
6. Andries Van Dam, Foley, Steven, John, Computer Graphics Principles and Practice, Pearson Education India (2002), 2nd Edition

Bachelor of Computer Applications Semester – VI
(Session 2023-24)
COURSE CODE: BCAL - 6112
SOFTWARE ENGINEERING

Course Outcomes:

After passing course the student will be able to:

CO1: Identify and evaluate various process model used for development of software.

CO2: Analyze gathered data to form requirement specifications and formulate design from this requirement specifications..

CO3: Comprehend activities involved in software project management.

CO4: Apply testing techniques on basic building blocks and control structure of a software.

Bachelor of Computer Applications Semester – VI
(Session 2023-24)
COURSE CODE: BCAL - 6112
SOFTWARE ENGINEERING

ExaminationTime: 3 Hours **Max. Marks: 75**
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT – I

Introduction to Software: Definition, Software characteristics, Software Components, Software Applications.

Introduction to Software Engineering: Definition, Software Engineering Paradigms, Waterfall Model, Prototyping Model, Incremental Model, Spiral Model.

UNIT – II

Requirement, Analysis and Specifications – Problem Analysis, Requirement Gathering Tools (Questionnaire, Interview, Group Discussion, and Observation), SRS Document and its Characteristics, Structured Analysis: Data Flow Diagram, Data Dictionaries.

Software Design – Characteristics, Structure Chart, Coupling, Cohesion, Functional Independence.

UNIT – III

Project Management – SPMP Document, Size Estimation (LOC, Function Point), COCOMO (Basic, Intermediate and Complete COCOMO), Effort Estimation, Development Time Estimation, Project Scheduling (Work Breakdown Structure, Activity Network, Critical Path Method, Gantt Chart, PERT Chart), Staffing.

Risk management and Control, software Maintenance and its types, Software Reuse, Software Reliability.

UNIT – IV

Coding– Coding Standards and Guidelines, Code Walkthrough, Code Inspection.

Testing - Test Case Design, Unit Testing, Black Box Testing (Equivalence Class Partitioning, Boundary Value Analysis), White Box Testing (Statement, Branch, Condition, Path Coverage), Cyclomatic Complexity, Integration Testing, System Testing (Alpha, Beta, Acceptance), Validation And Verification, Performance Testing.

References / Textbooks:

1. Roger S. Pressman, Software Engineering, McGraw-Hill series (2014) , 8th Edition.
2. Pankaj Jalote, A concise introduction to Software Engineering, Wiley (2008).
3. Rajib Mall, Fundamentals of Software Engineering, PHI Learning (2018), 5th Revised Edition
4. Kogent Learning Solutions Inc., Software Engineering, Dreamtech Press (2012)
5. Bruce R.Maxim, Roger S. Pressman, Software Engineering: A Practioner's Approach, McGraw Hill Education (2019), Eighth edition
6. David A. Gustafson, Schaum's Outline of Software Engineering, McGraw Hill (2020), 1st Edition

Bachelor of Computer Applications Semester – VI
(Session 2023-24)
COURSE CODE: BCAP - 6113
LAB ON COMPUTER GRAPHICS

Max. Marks: 50
Practical: 40
CA: 10

Examination Time: 3 Hours

Lab Based on Applications of Computer Graphics in C / C++.

Bachelor of Computer Applications Semester – VI
(Session 2023-24)
COURSE CODE: BCAD - 6114
PROJECT

Course Outcomes:
After passing this course the student will be able to:

CO1: Apply software engineering paradigms like Process Model, Analysis, Design, Testing, etc.

CO2: Work within defined time and resource constraints while developing real world application.

CO3: Address the Real World Problems and find the required solution.

CO4: Demonstrate an ability to work in teams and manage the conduct of the research study.

CO5: Formulate and propose a plan for creating a solution.

Bachelor of Computer Applications Semester – VI
(Session 2023-24)
COURSE CODE: BCAD - 6114
PROJECT

Examination Time: 3 Hours **Max. Marks: 300**
Practical: 240
CA: 60

General Instructions:

1. A software module based on the work done in the entire course is to be developed.
2. Candidates have to submit one hard copy and two CDs/DVDs of documentation which shall be kept with the HoD in the college only. Further, supervisor/guide shall forward one copy of DVD/CD containing all the documentation files of the students (file name to be saved as Rollno_of_the_ student.pdf) to the COE Office. The Covering letter (duly signed by the guide and Head of the department) should contain the following information: Candidate name, Candidate Roll no, Project Title of the student and .pdf file name of her project documentation.
3. The software module / website maybe developed in groups, consisting of at most two students in a group.
4. The college shall depute guide(s)/supervisor(s) under whose supervision the software module shall be developed. The guide/supervisor shall clarify that the work done is original and authenticated. The certificate found to be incorrect at any stage shall attract the proceedings against all the stakeholders, as per rules.
5. The evaluation of the module shall be done as per the common ordinance of UG/PG under semester system.