UNIVERSITY OF LUCKNOW

STUDY AND EVALUATION SCHEME

BACHELOR OF COMPUTER APPLICATION

YEAR: THIRD, SEMESTER –V

Sl. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
						Sessional Exam			Exam. ESE		
			L	T	P	CT	TA	Total			
1	**BCA-501**	Data Communication and Computer Network	3	1	0	20	10	30	70	100	**4**
2	**BCA-502**	Design and Analysis of Algorithm	3	1	0	20	10	30	70	100	**4**
3	**BCA-503**	Web design Concept	3	0	0	20	10	30	70	100	**3**
4	**BCA-504**	UNIX and Shell Programming	3	1	0	20	10	30	70	100	**4**
5	**BCA-505X**	Elective-I	3	0	0	20	10	30	70	100	**3**
PRACTICALS											
6	**BCA-506P**	UNIX Lab	0	0	2	10	10	20	30	50	**1**
7	**BCA-507P**	Web Design lab	0	0	3	10	10	20	30	50	**2**
8	**BCA-508P**	Viva-Voce on Summer Training	0	0	2	10	10	20	30	50	**1**
9	**BCA-GP**	General Proficiency	-	-	-	-	-	-	-	50	-
		Total	**15**	**3**	**7**					**700**	**22**

Elective-I

1. BCA-5051 Data Mining and Ware Housing
2. BCA-5052 Software Testing Methodology
3. BCA-5053 Open Source Software
4. BCA-5054 Information System: Analysis, Design & Implementation

BCA-501
Data Communication and Computer Network

L	T	P
3	1	0

Unit-1 **08**

Introduction Concepts: Goals and applications of networks, network structure and architecture, the OSI reference model, services, network topology design, delay analysis, back bone design, local access network design, physical layer transmission media, switching methods, ISDN, and terminal handling.

Unit-2 **12**

Medium Access Sub Layer: Medium access sub layer - channel allocations, LAN protocols - aloha protocols - overview of IEEE standards - FDDI.
Data Link Layer: Elementary data link protocols, sliding window protocols, and error handling.

Unit-3 **12**

Network Layer: Point - to point Networks, routing, congestion control Internetworking -TCP /IP, IP packet, IP address, and IPv6.
Transport Layer: Transport layer - design issues, and connection management.

Unit-4 **08**

Session Layer: Design issues and remote procedure call.
Presentation Layer: Design issues.
Application Layer: File transfer, access and management, electronic mail, virtual terminals, other application. Example networks - internet and public networks.

Text Books:

1. Forouzen, "Data Communication and Networking", TMH.
2. A.S. Tanenbaum, "Computer Networks", Pearson Education.
3. W. Stallings, "Data and Computer Communication", Macmillan Press.

Reference Books:

1. Anuranjan Misra, "Computer Networks", Acme Learning
2. G. Shanmugarathinam, "Essential of TCP/ IP", Firewall Media.
3. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", Mc Graw Hill Publisher.

BCA-502
Design and Analysis of Algorithm

L	T	P
3	1	0

Unit-1 **08**

Introduction: Algorithms, analyzing algorithms, complexity of algorithms, growth of functions, performance measurements, sorting and order statistics - shell sort, quick sort, merge sort, heap sort, comparison of sorting algorithms, and sorting in linear time.

Unit-2 **12**

Advanced Data Structures: Red-Black trees, B – trees, Binomial Heaps, Fibonacci Heaps.
Divide and Conquer Sorting, Greedy methods with examples such as Optimal Reliability Allocation, Knapsack, Single source shortest paths - Dijkstra's and Bellman Ford algorithms.

Unit-3 **12**

Dynamic Programming: Knapsack, all pair shortest paths – Warshal's and Floyd's algorithms, resource allocation problem. Backtracking, branch and bound, graph coloring, n-queen problem, Hamiltonian cycles, and sum of subsets.

Unit-4 **08**

Selected Topics: Algebraic computation, fast Fourier transform, string matching, theory of NP-completeness, approximation algorithms, and randomized algorithms.

Text Books:

1. Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms", Printice Hall of India.
2. E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms", Galgotia Press.
3. Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education.

Reference Books:

1. Jon Kleinberg and Éva Tardos, "Algorithm Design", Pearson.
2. Michael T Goodrich and Roberto Tamassia, "Algorithm Design: Foundations, Analysis, and Internet Examples", Wiley.
3. Harry R. Lewis and Larry Denenberg, "Data Structures and Their Algorithms", Harper Collins.

BCA–503
Web Design Concept

L	T	P
3	0	0

Unit-1 **12**

Introduction: Introduction and web development strategies, history of web and internet, protocols governing web, introduction to client-server computing, web applications, web project, and web team.

Unit-2 **08**

Web Page Designing: HTML: List, table, images, frames, forms, CSS, document type definition, object Models, presenting and using XML, **XML Processors**: DOM and SAX, and dynamic HTML.

Unit-3 **10**

Java script: Introduction, documents, forms, statements, functions, objects, introduction to AJAX, and VB script.

Unit-4 **10**

Server Site Programming: Introduction to active server pages (ASP), introduction to Java Server Page (JSP), JSP application design, JSP objects, conditional processing, declaring variables and methods, sharing data between JSP pages.

Text Books:

1. Burdman, Jessica, "Collaborative Web Development" Addison Wesley.
2. Xavier, "Web Technology and Design", New Age International.
3. Ivan Bayross, "HTML, DHTML, Java Script, Perl & CGI", BPB Publication.

Reference Books:

1. Ramesh Bangia, "Internet and Web Design", New Age International.
2. Deitel, "Java for programmers", Pearson Education.
3. Uttam k. Roy, "Web Technologies", Oxford.

BCA-504
UNIX and Shell Programming

L	T	P
3	1	0

Unit-1 **08**

UNIX Architecture: The UNIX operating system, LINUX and gnu. The UNIX architecture, features of UNIX, POSIX and single UNIX specification, internal and external commands, command structure, man browsing and manual pages on-line.

The file system: The parent – child relationship, the home variable, pwd, cd, mkdir, absolute pathname, and relative pathname.

Unit-2 **10**

Basic File Attributes: Listing directory contents, the UNIX file system, ls –l, -d option, file ownership, file permissions, chmod, directory permissions, changing file ownership, file attributes.

The Process: Process basics, process status, system processes (-e or –a), mechanism of process creation, process states and zombies, and running jobs in background.

Unit-3 **10**

Simple Filters: pr, head, tail, cut, paste, sort, uniq, tr.

Filters using regular expressions – grep and sed: grep, Basic Regular Expressions (BRE), Extended Regular Expressions (ERE) and egrep, the stream editor, and line addressing using multiple instructions (-E and -F) context addressing.

Unit-4 **12**

The Shell: The shell's interpretive cycle, shell offerings, pattern matching, escaping and quoting, redirection, pipes, tee, command substitution, shell variables, and essential shell programming.

Text Books:

1. Sumitabha Das, "UNIX – Concepts and Applications", Tata McGraw Hill.
2. Behrouz A. Forouzan, Richard F. Gilberg, "Unix and shell Programming", Thomson Learning.
3. Neil Matthew and Richard Stones, "Beginning Linux Programming", Wrox.

Reference Books:

1. Kernighan and Pike, "Unix programming environment", Pearson Education.
2. Rosen, Host, Klee, Farber, Rosinski, "The Complete Reference Unix", TMH.
3. Yashavant P. Kanetkar, "Unix Shell Programming", BPB Publications.

BCA-5051
Data Mining and Data Warehousing

L	T	P
3	0	0

Unit-1 **08**

Introduction: Data mining-definition & functionalities, data processing, form of data pre-processing, data cleaning: missing values, noisy data, binning, clustering, regression, inconsistent data, data integration and transformation, and data reduction.

Unit-2 **12**

Concept Description: Association rule mining, mining single-dimensional Boolean association rules from transactional databases, Apriori Algorithm, **Classification and Predictions:** Decision tree, Bayesian Classification, and K-nearest neighbour classifiers.

Unit-3 **08**

Data Warehousing: Overview, definition, delivery process, difference between database system and data warehouse, multi-dimensional data model, data cubes, stars, snowflakes, fact constellations, concept hierarchy, process architecture, 3 tier architecture, and data marting.

Unit-4 **12**

OLAP: Aggregation, historical information, query facility, OLAP function and tools. OLAP servers, ROLAP, MOLAP, HOLAP, data mining interface, security, backup and recovery.

Text Books:

1. M. H. Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education.
2. Jiawei Han, Micheline Kamber, “Data Mining Concepts & Techniques”, Elsevier.
3. Ian H. Witten, “Data Mining: Practical Machine Learning Tools and Techniques”, Morgan Kaufmann

Reference Books:

1. Sam Anahory, Dennis Murray, “Data Warehousing in the Real World: A Practical Guide for Building Decision Support Systems”, Pearson Education.
2. Mallach, “Data Warehousing System”, McGraw –Hill.
3. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining, & OLAP", Tata McGraw-Hill Education.

BCA-5052
Software Testing Methodology

L	T	P
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Unit-1 **10**

Introduction: Principles of software testing, error, fault, failure, incident, error and fault taxonomies, test cases, limitations of testing, code inspections, desk checking, group walkthroughs and peer reviews and overview of graph theory for testers.

Unit-2 **10**

Functional Testing: Boundary value analysis, equivalence class testing, decision table-based testing, cause effect graphing technique.

Structural Testing: Path testing, DD-paths, cyclomatic complexity, graph metrics, data flow testing and slice-based testing.

Unit-3 **08**

Testing Activities: Unit testing, levels of testing, integration testing, system testing, debugging, regression testing and extreme testing.

Unit-4 **12**

Object Oriented Testing: Issues in object-oriented testing, class testing, GUI testing, object-oriented integration and system testing. Testing internet applications: overview and challenges and strategies of testing internet applications.

Text Books:

1. Paul Ammann and Jeff Offutt, "Introduction to Software Testing", Cambridge University Press, Cambridge, UK.
2. Mauro Pezze, Michal Young, "Software Testing and Analysis: Process, Principles and Techniques", Wiley India.
3. Yogesh Singh, "Software Testing", Cambridge University Press, New York.

Reference Books:

1. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York.
2. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Van Nostrand Reinhold, New York.
3. Boris Beizer, "Software Testing Techniques", Van Nostrand Reinhold, New York.

BCA-5053
Open Source Software

L	T	P
3	0	0

Unit-1 **08**

Introduction- Introduction to open sources, need of open sources, advantages of open sources and application of open sources.

Unit-2 **12**

Open Source Operating Systems: LINUX- Introduction, general overview, kernel mode and user mode, process, advanced concepts, scheduling, personalities, cloning and signals.

Unit-3 **08**

Open Source Database: MySQL- Introduction - setting up account-starting, terminating and writing your own SQI programs, record selection technology, working with strings - date and time, sorting query results.

Unit-4 **12**

Open Source Programming Languages: PHP- Introduction - programming in web environment, variables, constants, datatypes, operators, statements, functions, arrays and OOP - string manipulation and regular expression.

Perl: Perl backgrounder, Perl overview, Perl parsing rules, variables and data -statements and control structures, subroutines, packages, and modules- working with files and data manipulation.

Text Books:

1. Martin C. Brown, “Perl: The Complete Reference", Tata McGraw-Hill Publishing Company Limited, Indian Reprint
2. Vikram Vaswani, "MYSQL: The Complete Reference", Tata McGraw -Hill Publishing Company Limited, Indian Reprint.
3. Paul Kavanagh, "Open Source Software: Implementation and Management", Elsevier.

Reference Books:

1. Rasmus Lerdorf and Levin Tatroe, "Programming PHP", O'Reilly.
2. Wesley J. Chun, "Core Phython Programming", Prentice Hall.
3. Steven Holzner, "PHP: The Complete Reference", Tata McGraw-Hill Publishing Company Limited, Indian Reprint.

BCA-5054
Information System: Analysis and Design & Implementation

L	T	P
3	0	0

Unit-1 **12**

Basic Concept of Systems: The system: definition and concepts, elements of a system: input, output processor, control, feedback, environment, boundaries and interface, characteristics of a system, types of systems -physical and abstract system, open and closed systems, man-made systems, information and its categories.

Information systems: TPS, OAS, MIS, DSS, ESS; System analyst: role and need of system analyst and system analyst as an agent of change.

Unit-2 **08**

System Development Life Cycle: Introduction to SDLC. Various phases: study, analysis, design, development, testing, implementation, and maintenance.

System documentation: Types of documentation and their importance.

Unit-3 **10**

Tools for System Analysis: Data flow diagram (DFD), logical and physical DFDs, developing DFD, system flowcharts and structured charts, structured English, decision trees and decision tables.

System design module specifications: Module coupling and cohesion, top-down and bottom-up design, logical and physical design and structured design.

Unit-4 **10**

System Implementation and Maintenance: Need of system testing, types of system testing, quality assurance; system conversion, conversion methods, procedures and controls, system evaluation and performance.

Text Books:

1. Perry Edwards, “System Analysis & design”, Mc Graw Hill Publication.
2. Jeffrey A. Hofer Joey F. George Joseph S. Valacich, “Modern System Analysis and Design”, Addison Weseley.
3. Shouhong Wang, “Information Systems Analysis and Design”, Universal-Publisher Boca Raton.

Reference Books:

1. Elias m. Awad, “System Analysis and Design”, Galgotia Publications Pvt. Ltd.
2. Henry C. Lucas, “Analysis, Design and Implementation of Information Systems”, McGraw-Hill Education.
3. Whitten, Bentaly and Barlow, “System Analysis and Design Methods”, Galgotia Publication.

BCA-506P
UNIX Lab

L	T	P
0	0	2

1. Execute the following list of basic commands in UNIX:

   (i) pwd (ii) mkdir (iii) cd

2. Execute the following list of basic commands in UNIX:

   (i) who (ii) echo (iii) cat

2. Execute the following list of basic commands in UNIX:

   (i) rm (ii) mv (iii) wc (iv) cp

4. Execute the basic file attributes with all possible options:

   (i) ls (ii) chmod

5. Execute basic commands using vi editor:

   a. input mode commands
   b. saving text and quitting

6. Execute basic commands using vi editor

   a. navigation
   b. editing text
   c. searching pattern

7. Execute the following filters using regular expressions with all possible options:

   (i) grep (ii) sed

8. Write a shell script to display current date and calendar.

BCA-507P
Web Design Lab

L	T	P
0	0	3

1. HTML program to create resume preparation using tables.
2. HTML program for home page creation using frames.
3. HTML program for form creation.
4. Create a web page to embed an image map in a web page using HTML.
5. Create a web page to get the coordinates from an image using java script.
6. Create a web page with all types of cascading style sheets.
7. Write HTML/Java scripts to display your CV in navigator, your institute website, Department website and tutorial website for specific subject.
8. Design HTML form for keeping student record and validate it using Java script.
9. Writing program in XML for creation of DTD, which specifies set of rules.
10. Create a style sheet in CSS/ XSL & display the document in internet explorer.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.