Himachal Pradesh Technical University, Hamirpur (H.P.)

CURRICULUM (CBCS)

Bachelor of Computer Applications (BCA)

(3^{rd} to 6^{th} Semester)

Teaching and Examination Scheme

BACHELOR OF COMPUTER APPLICATIONS (BCA)

SEMESTER –III

S. N.	Cat.	Subject Code	Title	Teaching Hours Per Weak			Credits	Examination	
				L	T	P/ D	C	IA	ESE
1	PC	BCA-301	Mathematics-II	4	1	0	4	40	60
2	PC	BCA-302	Computer Organization	4	1	0	5	40	60
3	PC	BCA-303	Visual Programming Using VB.Net	3	1	0	4	40	60
4	PC	BCA-304	Database Management System	3	1	0	5	40	60
5	E	-	Elective-I	3	0	0	3	40	60
Labs:									
1	PC	BCA-308	Visual Programming Using VB.Net Lab-V	0	0	1	2	30	20
2	PC	BCA-309	Database Management System Lab-VI	0	0	1	2	30	20
			Total	17	4	2	25		

Elective-I

S. N.	Cat.	Subject Code	Title	Teaching Hours Per Weak			Credits	Examination	
				L	T	P/D	C	I.A	ESE
1	E	BCA-305	Numerical Methods	3	0	0	3	40	60
2	E	BCA-306	Artificial Intelligence	3	0	0	3	40	60
3.	E	BCA-307	Management Information System (MIS)	3	0	0	3	40	60

BACHELOR OF COMPUTER APPLICATIONS(BCA)									
SEMESTER –IV									
S. N.	**Cat.**	**Subject Code**	**Title**	**Teaching Hours Per Weak**			**Credits**	**Examination**	
				L	**T**	**P/D**	**C**	**IA**	**ESE**
1	PC	BCA-401	Software Engineering	4	1	0	4	40	60
2	PC	BCA-402	Operating System	4	1	0	5	40	60
3	PC	BCA-403	Web Technologies (HTML, CSS, Java Script)	4	1	0	5	40	60
4	PC	BCA-404	Programming in Java	4	1	0	5	40	60
5	E	-	Elective-II	3	0	0	3	40	60
Labs:									
1	PC	BCA-408	Web Technologies (HTML, CSS, Java Script) Lab-VII	0	0	1	2	30	20
2	PC	BCA-409	Programming in Java Lab-Lab-VIII	0	0	1	2	30	20
			Total	19	4	2	26		

Elective-II									
S. N.	**Cat.**	**Subject Code**	**Title**	**Teaching Hours Per Weak**			**Credits**	**Examination**	
				L	**T**	**P/D**	**C**	**I.A**	**ESE**
1	E	BCA-405	Information and Cyber security	3	0	0	3	40	60
2	E	BCA-406	Microprocessors and Microcontrollers	3	0	0	3	40	60
3	E	BCA-407	Programming Principles and Algorithms	3	0	0	3	40	60

BACHELOR OF COMPUTER APPLICATIONS(BCA)										
SEMESTER –V										
S. N.	**Cat.**	**Subject Code**	**Title**	**Teaching Hours Per Weak**			**Credits**	**Examination**		
				L	**T**	**P/D**	**C**	**IA**	**ESE**	**Total**
1	PC	BCA-501	Human Values and Professional Ethics	3	1	0	4	40	60	100
2	PC	BCA-502	Programming in PHP	3	1	0	5	40	60	100
3	PC	BCA-503	Unix Operating System and Shell Programming	3	1	0	4	40	60	100
4	PC	BCA-504	Image Processing	3	1	0	5	40	60	100
5	E	-	Elective-III	3	0	0	3	40	60	100
Labs:										
1	PC	BCA-508	Lab- IX Programming in PHP	0	0	1	2	30	20	50
2	PC	BCA-509	Lab-X Unix Shell Programming	0	0	1	2	30	20	50
			Total	**15**	**4**	**2**	**25**			

Elective-III										
S. N.	**Cat.**	**Subject Code**	**Title**	**Teaching Hours Per Weak**			**Credits**	**Examination**		
				L	**T**	**P/D**	**C**	**I.A**	**ESE**	**Total**
1	E	BCA-505	Software Testing	3	0	0	3	40	60	100
2	E	BCA-506	Data Mining	3	0	0	3	40	60	100
3	E	BCA-507	Data Analysis Using R-Tool	3	0	0	3	40	60	100

BACHELOR OF COMPUTER APPLICATIONS(BCA)										
SEMESTER –VI										
S. N.	**Cat.**	**Subject Code**	**Title**	**Teaching Hours Per Weak**			**Credits**	**Examination**		
				L	**T**	**P/D**	**C**	**IA**	**ESE**	**Total**
1	PC	BCA-601	Cloud Computing	3	1	0	5	40	60	100
2	PC	BCA-602	Computer Networks	3	1	0	4	40	60	100
3	PC	BCA-603	Android Programming	3	1	0	3	40	60	100
4	E	-	Elective-IV	3	0	0	3	40	60	100
Labs:										
1	PC	BCA-607	Android Programming Lab-XI	0	0	1	2	30	20	50
2	PC	BCA-608	Major Project	0	0	2	5	30	20	50
			Total	**12**	**3**	**3**	**22**			

ELECTIVE-IV										
S. N.	**Cat.**	**Subject Code**	**Title**	**Teaching Hours Per Weak**			**Credits**	**Examination**		
				L	**T**	**P/D**	**C**	**I.A**	**ESE**	**Total**
1	E	BCA-604	Multimedia Technology	3	0	0	3	40	60	100
2	E	BCA-605	Network and Web Security	3	0	0	3	40	60	100
3	E	BCA-606	Distributed System	3	0	0	3	40	60	100

SEMESTER-III

BCA-301: MATHEMATICS - II

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**4**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	Order, degree, solution and formation of a differential equation. Standard techniques of solving linear differential equations with constant coefficients, Cauchy's and Legendres.	**13**
II	Complex numbers and their representation in a plane. Argand diagram, algebra of complex numbers, modulus and arguments of a complex number, square root of a complex number and cube roots of unity, triangle inequality, De-Moivre's theorem, roots of complex numbers.	**15**
III	Primes, Primarily testing, Factorization, Chinese Remainder Theorem, Quadratic congruence, Exponentiation and Algorithm	**16**
IV	Finite fields, GF (p) fields, GF (pn) fields, Polynomials and their operations over GF (2) and GF (2n).	**16**

Text Books:

1. Dummit, D. and Foote, R. ***Abstract Algebra***. Hoboken, NJ: John Wiley and Sons, 2004.
2. Durbin, J. ***Modern Algebra***, Hoboken, NJ: John Wiley and Sons, 2005.
3. Shepley L. Ross, ***Differential Equations***, John Wilay and Sons.
4. B.S. Grewal, ***Higher Engineering Mathematics***, Khanna Publisher.
5. J.P. Tremblay and R. Manohar, ***Discrete Mathematical structures with applications to Computer Science***, Tata McGraw Hill.

BCA-302: COMPUTER ORGANISATION

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
4	1	0	5	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Data representation:** number systems, decimal to binary, octal and hexadecimal conversion and vice versa, binary coded decimal numbers, hamming code for error detection, alphanumeric codes, arithmetic operations, binary addition and subtraction, addition/subtraction of numbers in 1's and 2's complement notation for binary numbers and 9's and 10's complement notation for decimal numbers, binary multiplication and division, BCD arithmetic, floating point addition and subtraction.	12
II	**Register Transfer Language:** Register transfer, Bus and Memory transfer (three-stage bus buffers, memory transfer), arithmetic micro-operations (Binary Adder, Binary-adder-Substractor, binary incrementer, arithmetic circuit), Logic micro-operation (list op logic micro operations, hardware implementation), shift micro operations (hardware implementation), arithmetic logic shift unit.	12
III	**Instruction codes:** (stored program organization, indirect address), computer registers (common bus register), computer instructions (instruction set completeness), timing and control, instruction cycle (fetch and decode, types of instruction, register-reference instructions), Micro programmed control, control memory, addressing sequencing (conditional branching, mapping of instructions, subroutine)	12

IV	**Central Processing Unit:** Introduction, general register organization (control word, examples of micro-operations), stack organization (register stack, memory stack, reverse polish notation, evaluation of arithmetic expressions), instruction formats (three-address instructions, two address instructions, one0address instructions), addressing modes, data transfer and manipulation (data transfer instructions, data manipulation instructions, arithmetic instructions, logical and bit manipulation instructions, shift instructions), Program control (status bit conditions, conditional branch instructions, program interrupt, types of interrupt).	**12**

Text Books:

1. M.Morris Mano, ***'Computer System Architecture'*** 3rd edition, PHI.
2. V. Rajaraman, T. Radhakrishanan, ***'An Introduction to Digital Design'***, PHI.
3. J.P.Hays, ***'Computer Organization and Architecture'***, McGraw Hill.

BCA-303: VISUAL PROGRAMMING USING VB.NET

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
3	1	0	4	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introducing .NET: .**Net Framework, History and Features of .Net Framework , Common language runtime(CLR). windows form and drawing classes, web classes.	12
II	**VB.NET :** Introduction, statement, lines, comments, operators, procedures, variables- implicit, explicit, constants, parameters, arrays, branching, looping, objects, classes, inheritance, accessibility of inherited properties and methods, overriding methods.	12
III	**Working with Forms :** Loading, showing and hiding forms, controlling One form within another. GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll bar, Timer, ListView, TreeView, toolbar, StatusBar.There Properties, Methods and events. OpenFileDilog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label. **Designing menues :** ContextMenu, access and shorcut keys.	12
IV	**Database programming with ADO.NET –** Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid.	12

Text Books:

1. Anne Boehm, Mike Murach ***'Murach's Visual Basic 2008'***, Publisher of Professional Programming.
2. Steven Holzner '***Vb.Net programming, Black Book***', Dream tech press.
3. Introduction to .net framework-WORX Publication.

BCA-304: DATABASE MANAGEMENT SYSTEM

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
3	**1**	**0**	**5**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**An overview of DBMS:** Concept of File Processing Systems and data base systems, Database Administrator and his responsibilities. Physical and Logical data independence. Three level Architecture of Database System: the external level, conceptual level and the internal level.	**12**
II	**Introduction to Data Models:** Entity Relationship Model, Hierarchical, Network and Relational Model. Comparison of Network, Hierarchical and Relational Model. Types of Database languages: DDL, DML, DCL, TCL, **Oracle:** Oracle product details, Overview of oracle architecture Oracle files, System and User process, Oracle Memory, System data base object, Oracle Data types. Structured query language (SQL), Using Oracle, Implementing SQL Functions, Integrity, Indexing, View Using Oracle, SQL Programming Control Structure, Looping, Array, Trigger, Courser.	**12**
III	**Relational data Model**: Relational database, relational algebra and calculus, SQL dependencies, functional dependency, multi-valued dependency and join, normalization.	**12**
IV	**Database protection:** Recovery, Concurrency Management, Database Security, Integrity and Control, Disaster Management Distributed databases: Structure of a distributed database, design of distributed databases.	**12**

Text Books:

1. Henry F. Korth, ***'Database System Concepts'***, Fifth Edition, McGraw Hill.
2. Ullman, ***'Principles of Database Systems'***, Second Edition, Galgotia Publications.
3. Bipin C. Desai, ***'An Introduction to Database System'***, Galgotia Publications.
4. C.J. Date, ***'An Introduction to DataBase Systems'***, Eighth Edition, Narosa Publications.
5. Naveen Prakash, ***'Introduction to Database Management'***, TMH.

BCA-305: NUMERICAL METHODS

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
3	**0**	**0**	**3**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Representation of numbers:** Decimal to Binary conversion, Floating point representation of numbers, Integer and real/floating point arithmetic, different types of errors, error in the approximation of a function, error in series approximation.	**12**
II	Solution of algebraic and transcendental equation using Bisection method, Regula-Falsi method, Newton-Raphson method. Solution of simultaneous linear equations using Gauss Elimination method, Gauss-Jordon method, Jacobi's iterative method, Gauss-Seidel iterative method.	**12**
III	Interpolation, Finite difference and operators, Newton Forward, Newton Backward, Games forward, Games backward.	**12**
IV	**Numerical differentiation:** Differentiating a Graphical function, Differentiating a Tabulated function- Equal and Un-equal intervals, Numerical integration, Newton -Cotes formula, Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ rule, Weddle's rule.	**12**

Text Books:

1. B.S. Grewal, ***Numerical Methods in Engg. and Science***, Khanna Book Publishing Co., New Delhi.
2. R.S. Salaria, ***Computer Oriented Numerical Methods***, Khanna Book Publishing Co., New Delhi.
3. V. Rajaraman, ***Computer Oriented Numerical Methods***, PHI.
4. S.S. Sastry, ***Numerical Method***, PHI.

BCA-306: ARTIFICIAL INTELLIGENCE

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
3	**0**	**0**	**3**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Overview Of A.I**.: Definition Of AI, The Importance Of AI, Previous Works In The History Of AI, AI And Related Fields, Problems, Problem Spaces And Search.	**12**
II	**Knowledge:** General Concepts –Definition and Importance of Knowledge, Knowledge-Based Systems, Representation Of Knowledge, Knowledge Organization, Knowledge Manipulation, Acquisition Of Knowledge.	**12**
III	**Formalized Symbolic Logics –** Syntax And Semantics For Propositional Logic, Properties of Wffs, Conversion To Clausal Form, Inference Rules, Resolution. Dealing With Inconsistencies - Truth Maintenance Systems, Symbolic Reasoning under Uncertainty, Statistical Reasoning. Structural Knowledge – Graph, Frames and Related Structures.	**12**
IV	**Natural Language Processing:** Overview of Linguistics, Grammer and Languages, Syntactic Processing, Semantic Analysis, Morphological, Discourse and Pragmatic Processing, Natural Language Generation, Natural Language Systems.	**12**

Text Books:

1. Dan W. Patterson, ***"Introduction to artificial intelligence and expert systems."*** Prentice-hall, India.

2**.** A rich and K. Knight, ***"Artificial intelligence"***, Tata Mcgraw hill.

3. E. Charnaik and d. mcdermott, ***"Introduction to Artificial Intelligence "***, addison-wesly publishing company.

BCA-307: MANAGEMENT INFORMATION SYSTEM (MIS)

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
3	0	0	3	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Management information system** - Introduction, Characteristics, Needs, Different views of MIS, Designing, Placement of MIS, Pitfalls in Designing an MIS, Computer based MIS – Advantages and Disadvantages.	12
II	**Project planning and Management:** Brief introduction to project planning and management and its tools/techniques-Gantt chart, PERT/CPM. Human Resources management: Concepts and functions, Job analysis and role description	12
III	**Managing the Project:** Managing the Task, Project Control, Managing to the Plan, Reviews, Feedback and Reporting Mechanisms, Configuration Management, Quality Control and Quality Assurance, Managing Change, Readjusting Goals and Milestones, Risk Management, Testing Phases, Formalized Support Activities, Managing the Team, Team Organizations,	12
IV	**Computer Applications in Business:** Need and Scope, Computer Applications in Project Management, Computer in Personnel Administration, Information System for Accounting-Cost and Budgetary Control, Marketing and Manufacturing, Computer Applications in Materials Management, Insurance and Stock-broking, Production planning and Control, Purchasing, Banking, Credit and Collection, Warehousing. Use of computers in common public services and e-governance.	12

TEXT BOOKS:

1. LM ***Ogranizational Behavior***, Sultan Chand And Sons, New Delhi.
2. Monappaarun And Salyajain M.S, ***Personal Management***, Tata Mc.Graw-Hill Publications.
3. Rudrabasavaraj M.N., ―Dynamic Personnel Administration, Himalaya Publishing House, Bombay.
4. Edwin B Flippo, ***Priciples Of Personal Management.***

BCA- 308: VISUAL PROGRAMMING USING VB.NET LAB-V

SUGGESTED LIST OF PRACTICAL TOPICS:

1. Loading, showing and hiding forms
2. Variables- implicit, explicit,
3. Arrays, branching, looping, objects, classes,
4. GUI Programming with Windows Form
5. Using GUI Components
6. Methods and events
7. Using OpenFileDilog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog
8. Database programming with ADO.NET
9. Display Data on data bound controls
10. Display data on data grid.

BCA- 309: DATABASE MANAGEMENT SYSTEM LAB-VI

SUGGESTED LIST OF PRACTICAL TOPICS:

1. Data Definition Language
a. Create
b. Alter
c. Drop
2. Data Manipulation Language
a. Insert
b. Select
c. Delete
d. Update
3. Clauses
a. Where
b. Having
c. Order By
d. Group By
e. Exists
f. In
g. Not in
h. Any
4. Arithmetic and Aggregate Operators
5. Sub queries
6. Data Control Language
7. Transaction Control Language
8. Control statements and looping
9. Arrays
10. Triggers

SEMESTER-IV

BCA-401: SOFTWARE ENGINEERING

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**4**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction:** Evolving Role of Software, Software Engineering, Changing nature of Software, Software Myths, Software Process and desired Characteristics, Software Life Cycle Models: Build and Fix Model, Water Fall Model, Incremental Process Model, Evolutionary Process Models, Unified Process, Comparison of Models, Other Software Processes, Selection of a Model, **Software Requirements Analysis and Specifications:** Requirements Engineering, Types of Requirements, Feasibility Studies, Requirements Elicitation, Requirements - Analysis Documentation, Validation and Management.	**12**
II	**Agile Methodology:** Agile Modeling, Its use and advantages, Scrum, Advantages and disadvantages of agile Modeling. **Software Architecture:** It's Role, Views, Component and Connector View and its architecture style, **Software Project Planning:** Size estimation, Cost Estimation, COCOMO, COCOMO – II, Software Risk Management.	**12**
III	**Function Oriented Design:** Design principles, Module level Concepts, Notation and Specification, Structured Design Methodology, Verification. **Object-Oriented Design:** OO Analysis and Design, OO Concepts, Design Concepts, Noun Phrase Analysis, Sequence and Collaboration Diagram, CRC cards, UML – Class Diagram, Other diagrams and Capabilities, Design Methodology – Dynamic and Functional Modeling, Internal Classes and Operations.	**12**
IV	**Coding:** Programming Principles and Guidelines, Coding Process, Refactoring, Verification, Software Metrics: What and Why, Token Count, Data Structure Metrics, Information Flow Metrics, Object-	**12**

	Oriented Metrics, **Software Maintenance and Certification:** Maintenance, Maintenance Process and Models, Estimation of Maintenance Costs, Regression Testing, Reverse Engineering	

Text Books:

1.Pankaj Jalote ***An Integrated Approach to Software Engineering***, Narosa Publishing.

2. K.K. Aggrawal and Yogesh Singh, ***Software Engineering,*** HouseNew Age International (P) Ltd.

3. Awad Elias N. *Second Edition,* ***System Analysis and Design*** Galgotia Publications.

4. Sen James A. *Second Edition,* ***Analysis and Design of Information System*** Tata McGraw Hill.

BCA-402: OPERATING SYSTEM

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**5**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction:** Application programs and system programs; functions of an operating system; classification of operating systems-Multi-user, multiprogramming, multiprocessing, time sharing, multi-threaded. Subsystems– Top Layer, Middle Layer, Bottom Layer, Bootstrap, Protection and security. Processes and Threads: Program vs. Process; Process context, address space, identification, transition, state and management. Thread management-benefits, synchronization issues; applications of threads.	**12**
II	**CPU Management:** Objectives, Pre-emptive vs. Non-pre-emptive, context switching, scheduling schemes; multi-processor scheduling, thread scheduling. Inter-process Communications: Introduction, message passing model, shared memory model. Pipe, FIFO and Socket.	**12**
III	**Memory Management:** Introduction, address binding, relocation, loading, linking, memory sharing and protection; Paging and segmentation; Virtual memory: basic concepts of demand paging, performance, page replacement. Thrashing. I/O Device Management: I/O devices and controllers, device drivers; disk storage, scheduling and management.	**12**
IV	**File Management:** Basic concepts, file operations, access methods, directory structures and management, remote file systems; file protection. Protection and Security: Need, environments: software, hardware, unauthorized use, denial of services, access control and authentication. Application security, attacks, virus andanti-virus, firewall.	**12**

Text Books:

1. Abraham Silberschatz and Peter Baer Galvin, ***Operating System Principles*** Seventh Edition, Published by Wiley-India
2. Sibsankar Haldar and Alex A. Aravind, ***An Introduction to Operating Systems*** By Dietel H.M., Second Edition, Published by Addison Wesley.
3. Milan Milenkovic, ***Operating system*** Second Edition
4. Stalling, W., ***Operating system*** Sixth Edition, Published by Prentice Hall (India).

BCA-403: WEB TECHNOLOGIES (HTML, CSS, JAVA SCRIPT)

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**5**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction to Internet:** Client-Server Technology, World Wide Web, Web-servers, Web Browsers, Web Hosting, Email. **Internet Protocols:** FTP, HTTP, HTTPS.	**12**
II	**HTML:** Document Structure, html elements, tags and attributes Basic elements (html, head, title body, p, heading, marquee behavior) Basic text formatting, List (ordered and unordered), Hyper linking; handling images, audio and videos; table elements; Form elements.	**12**
III	**Styling Pages (CSS):** Introduction to CSS; types of CSS (CSS-1, CSS-2, CSS-3), applying CSS (inline, embedded, external). **CSS Properties:** Text properties, font-properties, border properties. Selectors, universal, element selector, class selector, ID Selector, decedent selector, pseudo selector.	**12**
IV	**lntroduction to Java Script:** Basic functions (alert, confirm, prompt), adding javascript in page body. Document object model (DOM), Defining and calling functions: variables, operators, control structures. JavaScript Events, Predefined objects (String, date, math, array, window). **Validating form using JavaScript; Enhancing form with javascript:** Focusing on form element, Auto-tabbing between fields, disabling text input, Case Conversion.	**12**

Text Books:

1. Robert Sebesta ***Programming with world wide web*** ,Pearson Publication New Delhi.

2. ***Javascript Bible,*** Wiley India.

3. John Duckett, ***Beginning with HTML***, XHTML, CSS and Javascript Wiley- Wrox

BCA-404: PROGRAMMING IN JAVA

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
4	1	0	5	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Object Oriented Programming:** Introduction to OOP's Paradigm, Characteristics of OOP's. **History and Basics of Java:** Java's History and Creation, Java's Magic: Byte-code, it's Features, JDK, Java Program Structure, Java Data Types, Variables, and Operators, Operator Precedence. Scope of Variables, Control Structure **Array and String:** Declaration and Definition, String Handling Using String Class and it functions.	12
II	**Introduction of Classes:** Fundamental of Classes and Methods, Constructors, Creating Objects of a Class, **this**, Overloading Methods,**Extending Classes and Inheritance:** Fundamental of Inheritance, Using Existing Classes, Polymorphism, Super keyword, super-class constructor.**Packages and Interfaces:** Understanding Packages, Defining a Package, Packaging up Your Classes, Concept of Interface, Multiple Inheritance through Interfaces	12
III	**Exception Handling in Java:** Exception Handling basics, try, catch and finally, throw and throws clause, re-throwing of exceptions, handling user defined exceptions. **Multithreading Programming:** Understanding Threads, The Java Thread Model and life cycle of thread, The Main Thread, Creating a Thread, Creating Multiple Threads.	12
IV	**Working with Graphics and Text :**Working with Graphics, Working with Color, Setting the Paint Mode, Working with Fonts, Drawing Lines, Rectangles, Ovals, Arcs and Polygons **GUI Components:** Label, Buttons, Checkboxes, Choice, Lists, Scroll Bar, Text Field, Text Area, Menus and Layout Managers.	12

Text Books:

1. R. NageswaraRao, ***Core Java an integrated approach***, Dreamtech Press
2. Paul Deitel, HarveryDeitel, ***Java How to Program***, PHI New Delhi
3. ***The Complete Reference*** JAVA by Herbert Schildt, TMH Publication.
4. ***Beginning JAVA,*** Ivor Horton, WROX Public.

BCA-405: INFORMATION AND CYBER SECURITY

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
3	0	0	3	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Information Security Concepts :** Information Security Overview, Background and Current Scenario, **Principles of Security:** Information Classification, Policy Framework, Role based Security in an organization, Components of Information Systems, Balancing Information Security and Access, Approaches to information Security Implementation, Security Systems Development Life Cycle.	14
II	**Security Threats and Vulnerabilities:** Overview of Threats and Vulnerabilities-Intruders, Malicious Software, Viruses and related Threats, Desktop Security, **Email security:** PGP and S/MIME, **Web Security:** Web authentication, SSL and SET, Database Security. **Firewalls**: Overview, Design principles and Types.	15
III	**Security Management and Laws:** Introduction to Security Management, Access Control and Intrusion Detection, Overview of Identification and Authorization, Intrusion Detection Systems and Intrusion Prevention Systems, Security Procedures and Guidelines, Business Ethics and Best Practices, Security Assurance, Security Laws, IPR, International Security Standards, Security Audit, SSE- CMM / COBIT etc	15
IV	**Cryptography:** Concepts and Techniques, Symmetric and Asymmetric Key Cryptography, Steganography, **Symmetric Key Ciphers:** DES, AES (Structure and Analysis). **Asymmetric Key Ciphers:** Principles of Public Key-crypto systems, RSA Algorithm and its Analysis. Digital Signatures.	16

Text Books:

1. ***'Introduction to Information Security and Cyber Laws'*** Paperback by Surya Prakash
2. **'Principles of Information Security',** Paperback- by Whitman (Author).
3. **'Cryptography and Information Security',** Paperback – by Pachghare V.K (Author).

BCA-406: MICROPROCESSORS AND MICROCONTROLLERS

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
3	**0**	**0**	**3**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction to Microprocessors:** Historical Background of Microprocessors, Applications of Microprocessors, Introduction to 8085, Architecture of 8085, Pin Diagram of 8085.	**12**
II	Instruction Cycle, Timing Diagrams of Memory Read/Write Operations and timing diagrams of various Instructions, Addressing Modes, Instruction Set, Data Transfer Instructions, Arithmetic Instructions, Logical Instructions, Branch Instructions, Control Instructions, RISC and CISC Processors.	**12**
III	**Introduction to Microcontrollers:** Architecture of Microcontroller, Microcontroller Resources, Resources in Advanced and Next Generation Microcontroller, 8051 Microcontroller, Internal and External Memories, ROM Based Controller, Counters and Timers, Synchronous Serial and Asynchronous Serial Communication, Interrupts.	**12**
IV	**Peripheral Devices and Controllers:** Introduction and Architecture of DMA Controller 8257, Architecture of Programmable Interrupt Controller 8259, Clock Generator, Architecture of 8284.	**12**

Text Books:

1. ***'Microprocessor Architecture, Programming and Applications with 8085'***, Ramesh. S. Gaonkar, Fourth Edition, Penram International Publishing.
2. ***'8051 Microcontroller and Embedded Systems'***, Muhammad Ali Mazidi Janice Gillispie Mazidi, Second Edition, PHI.
3. ***'Fundamentals of Microprocessors and Microcomputers'***, B. Ram, Fourth Edition, Dhanpat Rai Publications
4. ***'The Intel Microprocessors 8086 / 8088, 80186 / 80188, 80286, 80386, 80486, Pentium Pro Architecture, Programming and Interfacing'***, B. Brey, Fifth Edition, Prentice Hall International.

BCA-407: PROGRAMMING PRINCIPLES AND ALGORITHMS

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
3	0	0	3	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction:** Definition, How to Analyze Algorithms, Elementary Data Structures-Stacks and Queues, Trees, Heaps and Heap Sort, Sets and Disjoint Set Union Graphs, Hashing.	12
II	**Divide and Conquer:** The General Method, Merge Sort, Quick Sort, Finding the Maximum and Minimum, Selection sort**. The Greedy Method:** The General Method Knapsack Problem, Job Sequencing With Deadlines, Minimum Spanning Trees, Single Source Shortest Paths.	12
III	**Dynamic Programming:** The General Method Multistage Graphs, All Pairs Shortest Paths, Optimal Binary Search Trees, 0/1 Knapsack, Reliability Design, Traveling Salesperson Problem, Flow Shop Scheduling.	12
IV	**Basic Search and Traversal Techniques:** The Techniques Code Optimization and/or Graphs, Game Trees, Bi-Connected Components And Depth First Search.	12

Text Books:

1. Ellis Horowitz, Sartaj Sahni, ***"Fundamental Of Computer Algorithms"***.
2. Aho, Hopcroft, Ullman", ***The Design And Analysis Of Computer Algorithms".***
3. Sara Basse, ***"Computer Algorithms – An Introduction to Design and Analysis".***

BCA- 408: WEB TECHNOLOGIES (HTML, CSS, JAVA SCRIPT) LAB-VII

SUGGESTED LIST OF PRACTICAL TOPICS:

1. Lists in HTML
2. Tables in HTML
3. Hypertext
4. Image and Videos in HTML
5. Hypermedia
6. Forms
7. CSS (Inline, Embedded, External)
8. Adding JavaScript in HTML page body.
9. Defining and calling a function in JavaScript,Variables in JavaScript.
10. Operators in JavaScript, Control Structures in JavaScript.

BCA- 409: PROGRAMMING IN JAVA LAB-VIII

SUGGESTED LIST OF PRACTICAL TOPICS:

1. Java Basics, Control Structure
2. Arrays and Strings
3. Fundamentals Of Classes
4. Extending Classes and Inheritance
5. Packages and Interfaces
6. Exception Handling
7. Multithreading Programming
8. Graphics (Lines, Rectangles, Ovals, Arcs and Polygons).
9. GUI Components (Label, Buttons, Checkboxes, Choice, Lists, Scroll Bar, Text Field, Text Area, Menu and layouts)

SEMESTER-V

BCA-501: HUMAN VALUES AND PROFESSIONAL ETHICS

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**4**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction to Value Education:** Understanding Value Education, Self-exploration as the Process for Value Education, The Basic Human Aspirations-Continuous Happiness and Prosperity, The Program to Fulfil Basic Human Aspirations.	**12**
II	**Understanding The Harmony At Various Levels:** Understanding the Human Being as Co-existence of Self ('I') and Body, Harmony in the Self ('I')-Understanding Myself, Harmony with the Body-Understanding "Sanyama" and "Svasthya".	**12**
III	**Harmony :** Harmony in the Family- Understanding Values in Human Relationships, Harmony in the society- From Family Order to World Family Order, Harmony in Nature- Understanding the Interconnectednee and Mutual Fulfilment, Harmony in Existence Understanding Existence as Co-existence.	**12**
IV	**Implications of the Right Understanding:** Providing the Basis for Universal Human Values and Ethics Human Conduct, Basis for the Holistic Alternative towards Universal Human Order, Professional Ethics in the Light of Right Understanding, Vision for Holistic Technologies, Production Systems and Management Models, Journey towards the Holistic Alternative.	**12**

Text Books:

1. RR Gaur, R Sangal, GP Bagaria, ***A foundation course in Human Values and professional ethics,*** Excel Book, New Delhi.

2. S. Kannan, K. Srilakshmi, ***Human Values and Professional Ethics with relevant case studys,*** Taxmann Publications Private Limited.

3. M. Govindarajan, S. Senthikumar, M.S. Natarajany, ***Professional Ethics and Human Values,*** PHI

502: PROGRAMMING IN PHP

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
4	1	0	5	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	Introduction to Java Script: Basic functions (alert, confirm, prompt), adding javascript in page body. Document object model (DOM), Defining and calling functions: variables, operators, control structures. JavaScript Events, Predefined objects (String, date, math, array, window).	12
II	PHP: Overview of server side scripting, phpinfo(); embedding PHP Codes in HTML,generating HTML Codes using PHP. PHP Operators and Expressions. PHP Control Statements	12
III	MySQL: Connecting to database-server, Selecting database, creating query, reading records from database, storing records in database.	12
IV	Advanced Web development tools: CMS Systems, Need of CMS, Types of CMS, Introduction to Open Source website creation tools (WordPress, Joomla, Magento, Drupal).	12

Text Books:

1. John Duckett, ***Beginning with HTML, XHTML, CSS and Javascript*** Wiley- Wrox

2 .Ulman,. ***PHP and MySQL5*** Larry Pearson .

3. ***CakePHP, And Zend,*** Building PHP Applications WithSymfony, Framework by BartoszPorebski Karol PrzystalskiLeszek Nowak, Wiley Ind

BCA-503: UNIX OPERATING SYSTEM AND SHELL PROGRAMMING

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**5**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction to Unix:** Unix distributions, Unix operating system, Unix architecture, Features of Unix, Accessing Unix system, Starting and shutting down system, Logging in and Logging out.	**12**
II	**Commands in Unix:** General-Purpose commands, File oriented commands, directory oriented commands, Communication-oriented commands, process oriented commands, etc. Regular expressions and Filters in Linux: Simple filters viz. more, wc, diff, sort, uniq, etc.,grep, sed. introducing regular expressions. Regular expressions and Filters in Linux: Simple filters viz. more, wc, diff, sort, uniq, etc.,grep, sed. introducing regular expressions.	**12**
III	**Regular expressions and Filters in Unix:** Simple filters viz. more, wc, diff, sort, uniq, etc.,grep, sed. introducing regular expressions. Unix file system: Linux/Unix files, inodes and structure and file system, file system components, standard file system, file system types, file system mounting and unmounting.	**12**
IV	**Shell Programming:** vi editor, shell variables, I/O in shell, control structures, loops, subprograms, creating shell scripts.	**12**

Text Books:

1. John Goerzen: ***Linux Programming Bible,*** IDG Books, New Delhi.

2. Sumitabha Das: ***Your Unix - The Ultimate Guide***, TMH.

3. Richard Petersen: ***The Complete Reference – Linux***, McGraw-Hill 4. Yashwant Kanetkar: Unix and Shell programming - BPB

BCA-504: IMAGE PROCESSING

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**5**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction:** Image Processing, Applications of Image Processing, Elements of Image Processing Systems—Image Acquisition, Processing, Communication, Display Digital Image Processing, Goals of Image Processing, Sources of Images, Image Classification and Formation, Image Representation and Sampling, Basic operations on Images.	**12**
II	**Digital Image Fundamentals:** Uniform and Non-uniform Sampling and Quantization, Basic Relationships between pixels —Neighbours of a pixel, Connectivity, Distance Measures, Imaging Geometry—Perspective transformations, Camera Model, Stereo Imaging.	**12**
III	**Image Transforms:** Introduction to Fourier Transform, Discrete Fourier Transform, Properties of the Two - Dimensional Fourier Transform, The Fast Fourier Transform (FFT), Inverse FFT, Walsh, Hadamard and Discrete Cosine Transforms.	**12**
IV	**Image Enhancement:** Histogram Processing, Image Averaging, Smoothing Filters, Sharpening Filters, Low Pass and High Pass Filtering, Generation of Spatial Masks from frequency Domain Specifications.	**12**

Text Books:

1. Gonzalez andWoods : ***Digital Image Processing,*** Pearson Publishing Company Ltd.
2. Jain , Anil K. : ***Fundamentals of Digital Image Processing,*** Pearson.
3. Jensen, John R. ***: Introductory Digital Image Processing,*** Prentice Hall.
4. Dougherty, Edward R. ***: Image Processing Digital Techniques.***

BCA-505: SOFTWARE TESTING

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
3	**0**	**0**	**3**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction:** Definition (testing, fault, error, failure, bug, mistake), test oracle, test case, Process, Limitations of Testing. Functional Testing: Boundary Value Analysis- Introduction Definition, Generalizing, limitations, Robustness testing, Worst-case testing, Test cases.	**12**
II	**Equivalence Class Testing:** Introduction and Definition, Weak normal, strong normal, Weak robust, Strong robust, Test cases. Decision Table Based Testing- Introduction and Definition, technique, test cases.	**12**
III	**Structural Testing:** Path testing - Introduction and definition, DD-path, Test coverage metrics, McCabe‘s basis path method, its observations and complexity. Data Flow Testing: Definition, data flow graphs, data flow model, Data flow testing strategies.	**12**
IV	**Levels of Testing:** Traditional view of testing levels, Integration Testing (Decomposition based integration), Unit Testing, System Testing. Metrics and Complexity: Metrics definition, objectives, Linguistic Metrics: definition, LOC, Statement counts, Related metrics, Halstead‘s Metrics, Token count.	**12**

Text Books:

1. R A Khan, K Mustafa, SI Ahson, ***Software Quality- Concepts and Practices,*** Narosa Publishing House.

2. Boris Beizer, ***—Software Testing Techniques,*** Dreamtech press.

3. Paul C. Jorgensen. Software Testing- A Craftsman Approach, CRC Press

BCA-506: DATA MINING

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
3	0	0	3	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction to Data Mining**: functionalities, Mining different kind of data, Pattern/Context based Data Mining, Bayesian Classification: Bayes theorem, Bayesian belief networks Naive Bayesian classification.	12
II	**Introduction to classification:** Back propagation and its algorithm, Other classification methods: k-Nearest Neighbor, case based reasoning, Genetic algorithms, rough set approach, Fuzzy set approach.	12
III	**Introduction to prediction:** linear and multiple regression, Clustering: types of data in cluster analysis: interval scaled variables, Binary variables, Nominal, ordinal, and Ratio-scaled variables;	12
IV	**Major Clustering Methods:** Partitioning Methods: K-Mean and K-Mediods, Hierarichal methods: Agglomerative,	12

Text Books:

1. Han and M. Kamber, Data Mining: ***Concepts and Techniques,*** Publisher Morgan Kaufmann Publishers

2. Elzbieta Malinowski and Esteban Zimányi, ***Advanced Data warehouse Design*** by Publisher Springer

3. George M Marakas, ***Modern Data Warehousing, Mining and Visualization*** Publisher Pearson

BCA-507: DATA ANALYSIS USING R-TOOL

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
3	0	0	3	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction and preliminaries** : The R environment, Related software and documentation, R and statistics, R and the window system, Using R interactively, Getting help with functions and features, R commands, Recall and correction of previous commands , Executing commands from or diverting output to a file, Data permanency and removing objects.	12
II	**Simple manipulations:** Numbers and vectors, Vectors and assignment, Vector arithmetic, Generating regular sequences, Logical vectors, Missing values, Character vectors, Index vectors; selecting and modifying subsets of a data set, Other types of objects	12
III	**Objects, their modes and attributes:** Intrinsic attributes, mode and length, Changing the length of an object, Getting and setting attributes, The class of an object. Ordered and unordered factors:A specific example, The function tapply() and ragged arrays Ordered factors.	12
IV	**Arrays and matrices:** Arrays, Array indexing. Subsections of an array, Index matrices, The array() function, The recycling rule, The outer product of two arrays, Generalized transpose of an array, Matrix facilities, Forming partitioned matrices, cbind() and rbind(). The concatenation function, c(), with arrays, Frequency tables from factors.	12

Text Books:

1. W. N. Venables, ***An Introduction to R,*** R Core Team.
2. Bansal/Goel/Sharma, ***MALAB and its Applications in Engineering***, Pearson India.
3. Stephen J. Chapman, ***MATLAB Programming for Engineers***, CENGAGE Learning.

BCA- 508: PROGRAMMING IN PHP LAB-IX

SUGGESTED LIST OF PRACTICAL TOPICS:

1. Basic Programming variables, operators, control structures.
2. JavaScript Events,
3. Predefined objects
4. Server side scripting, phpinfo()
5. Generating HTML Codes using PHP
6. PHP Control Statements
7. Connecting to database-server, reading records from database,
8. Storing and deleting records in database
9. Creating a Simple website.
10. Source website creation tools (WordPress, Joomla, Magento, Drupal).

BCA- 509: UNIX SHELL PROGRAMMING LAB-X

SUGGESTED LIST OF PRACTICAL TOPICS:

1. Study Experiment- UNIX basics
2. Basic Shell Programming (Fibonacci Series generation, Factorial of a given number, Checking for Armstrong number)
3. Designing a Arithmetic calculator
4. Generation of Multiplication table
5. Base Conversion (Decimal to Binary, Binary to Decimal)
6. Checking for a Palindrome of a number
7. Finding the information about the Login name and File name
8. Students Evaluation
9. Process Creation (Basics, Arithmetic operations on processes, Displaying process ID, Creation of grandchild processes)
10. System calls (Usage of link(), Usage of dup(), Renaming a file)

SEMESTER-VI

BCA-601: CLOUD COMPUTING

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**4**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction to Cloud Computing:** Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS. **Cloud computing platforms:** Infrastructure as service: Amazon EC2,Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing.	**14**
II	**Introduction to Cloud Technologies:** Study of Hypervisors Compare SOAP and REST Web services, AJAX: asynchronous 'rich' interfaces, Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization.	**15**
III	**Map-Reduce and extensions:** Parallel computing, The map-Reduce model, Parallel efficiency of MapReduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Mapreduce, Features and comparisons among GFS,HDFS etc, Map- Reduce model .	**14**
IV	**Cloud Security:** Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control-Identity management, Access control, Autonomic Security	**17**

Text Books:

1. Pawan Thakur, Susheela Pathania ,***Cloud Computing,*** Satya Prakashan, New Delhi.
2. Judith Hurwitz, R.Bloor, M.Kanfman ***Introduction of Cloud Computing*** for Dummies.
3. Judith Hurwitz, R.Bloor, M.Kanfman,***Cloud Computing*** for Dummies

BCA 602: COMPUTER NETWORKS

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
4	1	0	5	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction:** Data Communication, Network Components. OSI Reference Model: Layered architecture, Functions of layers, TCP/IP reference model, Comparison of OSI and TCP/IP models. Internet, frame relay, ATM, Ethernet, Wireless LAN.	12
II	**Physical layer:** Theoretical basis for data communications-Fourier analysis, bandwidth limited signals, maximum data rate of a channel, Public switched telephone networks, mobile telephone system. Data Link and Mac Layer: Design issues, Framing techniques, Flow control, Error Control.	12
III	**Network and transport Layer:** Network layer design issues, Routing algorithms-shortest path routing, flooding, distance vector routing, link state routing, hierarchical routing, broadcast routing, multicast routing, routing for mobile hosts.	12
IV	**Internetworking:** Tunneling, internet-work routing, fragmentation, Network layer in Internet: IP protocol, IP Address, OSPF, BGP, Internet multicasting, Mobile IP, Ipv6.Transport Layer: Concept of transport service, elements of transport protocols, a simple transport protocol, Remote procedure call, Performance issues in computer networks.	12

Text Books:

1. B.A. Forouzan, ***—Data Communication and Networking***, Tata Mcgraw Hill.
2. A.S. Tanenbaum, ***—Computer Networks***, Prentice Hall.
3. William Stallings, ***—Data and Computer Communication***, McMillan Publishing Co.

BCA-603: ANDROID PROGRAMMING

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**5**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction to Android:** Overview, History, Comparison, Advantages, Open Handset Alliance, Android Internals, Android Architecture. Android Development Environment: Android development frameworks, Android-SDK, Eclipse, Creating Android Emulator, Android AVD, Android Application Structure, Android Project Framework, Crating a Project.	**12**
II	**Android Activities and UI Design:** Intent, Activity, Activity Lifecycle, Manifest, Creating application and new activity, Testing and debugging (DDMS, Step Filters and LogCat). Layouts and Layout properties:Layouts, Drawable Resources, Resolution and density independence (px,dip,dp,sip,sp)	**12**
III	**GUI objects:** Push Button,Text / Labels, EditText, ToggleButton, WeightSum, Padding, Layout Weight.Advanced UI Programming: Event driven Programming in Android (Text Edit, Button clicked etc.) Creating a splash screen, Threads, Understanding Exception handler, Animation, View animation, Drawable animation.	**12**
IV	**Toast, Menu, Dialog, List and Adapters**: Status bar, Menu, Custom Vs. System Menus, Creating and Using Handset menu Button, Themes, Dialog, Alter Dialog, Toast in Android, List and Adapters, Manifest.xml File Update. Database – **SQLite:** Shared preferences, Preferences activity, Files access, SQLite, SQLiteOpenHelper, Creating a database, Opening and closing a database, Working with cursors Inserts, updates, and deletes.	**12**

Text Books:

1. J. Schiller, ***Mobile Communications***, Addition Wesley Publication.
2. Reto Meier, ***Professional Android™ Application Development*** Wrox Publications,
3. Hansmann, Merk, Nicklous, Stober, ***"Principles of Mobile Computing",*** Springer, second edition.
4. Hansmann, Merk, Nicklous, ***Stober, Principles of Mobile computing,*** Springer International Edition.

BCA-604: MULTIMEDIA TECHNOLOGY

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
4	**1**	**0**	**5**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction to Multimedia :** Needs and areas of use, Development platforms for multimedia, Identifying Multimedia elements Text, Images, Sound, Animation and Video, Making simple Multimedia with PowerPoint. Concepts of plain and formatted text, RTF and HTML texts, Object Linking and Embedding concept.	**12**
II	**Sound:** Sound and it Attributes, Mono V/S Stereo Sound, Sound Channels, Sound and Its Effect In Multimedia, Analog V/S Digital Sound, Overview Of Various Sound File Formats On PC WAV, MP3.	**12**
III	**Graphics:** Importance of Graphics in Multimedia, Vector and Raster Graphics, Image Capturing Methods Scanner, Digital Camera Etc. Various Attributes of Images Size, Color, Depth , Resolution etc, Various Image File Format BMP, DIB, EPS, PIC, and TIF Format Their Features and imitations, Basics of animation, Software Tools for animation.	**12**
IV	**Video:** Basics of Video Analog and Digital Video, How to use video on PC. Introduction to graphics accelerator cards, Brief note on various video standards NTSC, HDTV, Introduction to video capturing Media and instrument Videodisk. Virtual Reality Terminology Head Mounts Display (HMD), Boom, Cave, Input Devices and Sensual Technology	**12**

Text Books:

1. Tay vaughan, ***Multimedia: Making it work (4th edition)***, Tata McGraw Hills.

2. James E Shuman, ***Multimedia in action,*** Vikas Publishing House.

3. Andreas hoi zinger, ***Multimedia basics volume / technology, firewall media*** (Laxmi Publications Pvt. Ltd) New Delhi.

BCA-605: NETWORK AND WEB SECURITY

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	**T**	**P/D**	**C**	**Sessional**	**End Semester Exam**	**Total**
3	**0**	**0**	**3**	**40**	**60**	**100**

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Software Security and Trusted Systems:** Buffer Overflow, Stack Overflows, Defending Against, Buffer Overflows, Other Forms of Overflow Attacks, Software Security, Software Security Issues, Handling Program Input, Writing Safe, Program Code, Interacting with the Operating System and Other Programs, Handling Program Output.	**12**
II	**Operating System Security:** Introduction to Operating System Security, System Security Planning, Operating Systems Hardening, Application Security, Security Maintenance, Linux/Unix Security, Windows Security, Virtualization Security.	**12**
III	**Control hijacking attacks:** exploits and defenses, Principle of least privilege, access control, Tools for writing robust application code. Dealing with legacy code: sandboxing and isolation, Exploitation techniques and fuzzing.	**12**
IV	**Security issues in Internet protocols:** TCP, DNS, and routing. Network defense tools: Firewalls, VPNs, Intrusion Detection, and filters. Basic web security model: Web application security, Session management and user authentication, Overview of cryptography. HTTPS: goals and pitfalls, Content Security Policies (CSP), Web workers, and extensions.	**12**

Text Books:

1. W. Stallings, ***Computer Security: Principles and Practice*** 2nd Edition, Prentice Hall.
2. M. Stamp, ***Information Security: Principles and Practice,*** Wiley.
3. ***Software Security: Building Security*** , Addison Wesley

BCA-606: DISTRIBUTED SYSTEM

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credits	Marks		
L	T	P/D	C	Sessional	End Semester Exam	Total
3	0	0	3	40	60	100

COURSE CONTENTS:

Unit	Contents	No. of hours
I	**Introduction and Architectures:** Definition of a Distributed System, Goals and Types of distributed systems, Architecture Styles, System Architectures, Middleware, Self-management in Distributed Systems with examples of Astrolabe, Globule and Jade. Processes: Threads, Virtualization, Clients, Servers and Code Migration	12
II	**Communication:** Remote Procedure Call, Message-Oriented, Stream Oriented and Multicast Communication Naming: Names, Identifiers and Addresses, Flat naming, Structured Naming and Attribute-Based Naming.	12
III	**Synchronization:** Clock Synchronization, Logical Clocks: Lamport's Logical Clocks and Vector Clocks, General Introduction to the Concepts of Replication and Fault Tolerance Distributed File Systems: Client-Server Architecture in NFS, Cluster-based Architecture in Google, Symmetric Architectures, RPC in NFS.	12
IV	**Distributed Web-Based Systems:** Architecture, Processes i.e. clients, Apache Web Server and Web Server Clusters, Communication i.e. HTTP and Simple Object Access Protocol, Web Proxy Caching	12

Text Books:

1. Tanenbaum, A. and van Steen,Distributed Systems: Principles and Paradigms.
2. Coulouris, G, Dollimore, J., and Kindberg, T., Addison-Wesley Distributed Systems: Concepts and Design.
3. Rachid Guerraoui and Louis Introduction to Reliable Distributed Programming

BCA-607- ANDROID PROGRAMMING LAB-XI

SUGGESTED LIST OF PRACTICAL TOPICS:

1. Creating application and new activity,
2. Layouts, Drawable Resources, Resolution and density independence
3. Creating Push Button, Text / Labels, EditText, ToggleButton, WeightSum, Padding,
4. Event driven Programming in Android (Text Edit, Button clicked etc.)
5. Creating a splash screen, Threads
6. Understanding Exception handler, Animation, View animation, Drawable animation.
7. Status bar, Menu, Custom Vs. System Menus
8. Creating and Using Handset menu Button
9. Themes, Dialog, Alter Dialog,
10. Toast in Android, List and Adapters
11. SQLite, SQLiteOpenHelper,
12. Creating a database, Opening and closing a database,
13. Working with cursors Inserts, updates, and deletes.

BCA- 608: MAJOR PROJECT

A MANUAL FOR PREPARATION OF PROJECT REPORT (BCA)

1. GENERAL

The manual is intended to provide broad guidelines to the B.C.A. candidates in the preparation of the project report. In general, the project report shall report, in an organized and scholarly fashion an account of original research work of the candidate leading to the discovery of new facts or techniques or correlation of facts already known (Analytical, Experiments, Software designing, Software development, Database designing, Testing, Hardware oriented etc.)

2. NUMBER OF COPIES TO BE SUBMITTED

Students should submit three copies to the Head of the Department on or before the specified date along with the soft copy of project report and executable file of application software properly write in CR, entitled "Title of the Project Report", "Name" and "Roll No" of the candidate with black or blue permanent marker. The Head of the Department should send:

a) One copy to the Department library. (After final viva-voice)

b) One copy to the Internal Examiner (Before final viva-voice)

c) One copy to the student concerned (Not to be submitting to the Head of the Department).

3. SIZE OF PROJECT REPORT

The size of project report should not be less than 80 pages and should not exceed 100 pages of typed matter reckoned from the first page of INTRODUCTION to the last page.

4. ARRANGEMENT OF CONTENTS OF PROJECT REPORT

The sequence in which the project report material should be arranged and bound should be as follows:

a) Title page

b) Declaration

c) Certificate

d) Acknowledgement

e) Table of Contents

5. BINDING SPECIFICATIONS

Project report submitted for B.C.A. should be bound using hard cover (Spiral binding). The title page should be printed on the front panel of the project report.