Punyashlok Ahilyadevi Holkar Solapur University, Solapur

पुण्यश्लोक अहिल्यादेवी होळकर
सोलापूर विद्यापीठ
।। विद्यया संपन्नता ।।

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Bachelor of Computer Applications

Name of the Course: B. C. A. Part- III (Sem. V & VI)

(Syllabus to be implemented from w.e.f. June 2021)

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Choice Based Credit System (CBCS), (w. e. f. June-2021)

Syllabus for B. C. A. – Part III (Science)

Name and Type of the Paper		Title of Paper	Hrs/Wee		Total Marks per paper	UA	CA	Credits
Type	**Name**		**L**	**P**				
B. C. A. – III Semester V								
English (Business English)	English (Business English)		4	-	50	40	10	2.0
DSE 1 A	Paper IX	Core Java	4	-	100	80	20	4.0
DSE 2 A	Paper X	Visual Programming	4	-	100	80	20	4.0
DSE 3 A	Paper XI	Computer Graphics	4	-	100	80	20	4.0
DSE 4 A	Paper XII	Recent Trends in IT	4	-	100	80	20	4.0
SEC 3	Paper XIII	Linux and Shell Programming	4	-	100	80	20	4.0
	Total (Theory)		**24**	**-**	**550**	**440**	**110**	**22.0**
B. C. A. – III Semester VI								
English (Business English)	English (Business English)		4	-	50	40	10	2.0
DSE 1 B	Paper XIV	Advanced Java	4	-	100	80	20	4.0
DSE 2 B	Paper XV	Dot Net Technology	4	-	100	80	20	4.0
DSE 3 B	Paper XVI	Data Warehouse and Data Mining	4	-	100	80	20	4.0
DSE 4 B	Paper XVII	Cryptography and Network Security	4	-	100	80	20	4.0
SEC 4	Paper XVIII	Advanced Python	4	-	100	80	20	4.0
	Total (Theory)		**24**	**-**	**550**	**440**	**110**	**22.0**
Practical								
DSE 1A &1B	Practical IV	Practical On Core Java and Advance Java	-	5	100	80	20	4.0
DSE 2A &2B	Practical V	Practical on Visual Programming and .Net Technology	-	5	100	80	20	4.0
DSE 3A &3B	Practical VI	Practical on Computer Graphics And DM & DW	-	5	100	80	20	4.0
	Practical VII	Project	-	5	100	80	20	4.0
	Total (Practicals)		**-**	**20**	**400**	**320**	**80**	**16**
Grand Total			**48**	**20**	**1500**	**1200**	**300**	**60**

BCA Part - III

Semester V

Course Code: Paper IX **Course Title: Core Java**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I	**Introduction to Java Programming** • Overview of Java • Features of Java as programming language / Platform • JDK Environment and Tools	03
II	**Java Programming Fundaments** • Data types, Variables, Operators, Keywords, Naming Conventions • Structure of Java Program • Flow Control- Decision, Iterations • Arrays	03
III	**Classes and Objects** • Class – Members access control, Objects, Constructors, Use of 'this' keyword • Static, non-static data members and methods. • public, private & protected data members	03
IV	**Inheritance & Polymorphism** • Access/Scope specifiers protected • Super, extends, single, multiple inheritance • Method overriding • Abstract classes & ADT, 'final' keyword • Extending interfaces	05
V	**Exception Handling** • Exceptions and Types, try. catch and finally block • throw & throws statement, user-defined exceptions	06
VI	**Threading** • Java thread lifecycle • Thread class & run able interface Thread priorities & synchronization • Usage of wait & notify	10
VII	**Java I/O** • Java I/O package, byte & character stream • Reader & writer, file reader & file writer	10
VIII	**Event Programming** • Java awt components: window, Frame, Panel, Dialog, File Dialog, Label, Button, List, Check Box, Text Components, Choice, Menu Components • Layout Managers • Border, Flow, Grid, Event Model • Listeners / Adapters	10
IX	**JDBC** • Introduction to JDBC • Feature & Architecture of JDBC • Types of drivers, its advantage & disadvantage • JDBC Statements & Methods : statement, PreparedStatement, Callable Statement, execute(), executeQuery(), executeUpdate(), Working with Resultset interface, Working with Resultset Metadata	10

Reference Books:

1. Java 2 for professional developers [by Michael Morgen]
2. Jdbc, Servlets & JSP black book [by Santoshkumar K. Kogent Solution Inc.]
3. Core Java Vol 1 and Vol 2 [by Cay. S. Horstmann, Gray Cornell]
4. Java The complete Reference [by Herbert Schildt]

BCA Part - III

Semester V

Course Code: Paper X **Course Title: Visual Programming**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No	Description	No. of Lectures
I	**Introduction to Dot.Net Framework** • Introduction to DOTNET • DOT NET class framework • Common Language Runtime • Overview • Elements of .NET application • Memory Management • Garbage Collector : Faster Memory allocation, • Optimizations • Common Language Integration • Common type system • User and Program Interface	**08**
II	**Introduction to C#** • C# Language elements • Data types -Reference Type and Value Type • Boxing and Unboxing • Enum and Constant • Operators • Control Statements • Working with Arrays and Strings • Parameter passing technique: • Pass by value and by reference, out parameters, Variable length parameter	**10**
III	**Object oriented concepts** • Working with Indexer and Properties • Constructor & Destructor • Working with "static" Members • Inheritance & Polymorphism - Types of Inheritance - Constructor in Inheritance - Interface Implementation - Operator and method Overloading and overriding - Static and Dynamic Binding and • Virtual Methods • Abstract Class, sealed keyword	**10**
IV	**Exception Handling** • What is Exception • Rules for Handling Exception • Exception classes and its important properties • Understanding & using try, catch keywords • Throwing exceptions • Importance of finally block	**04**

V	**USING I/O Class** • Streams Class • Text Stream and Binary Stream • System.IO and Base classes of Stream • Console I/O Streams • Working with File System -File ,FileInfo, • Directory ,DirectoryInfo classes	**04**
VI	**Delegates** • Introduction of Delegation • Types of delegate • Anonymous Methods	**03**
VII	**Collections & Generics** • Collection classes: • ArrayList, Hashtable, stack, queue. • Writing custom generic classes. • Working with Generic Collection Classes	**05**
VIII	**Windows Forms** • Controls: Common control Group, • Data control Group, Dialog control Group, • Container control Group • Menus and Context Menus: Menu Strip, • Toolbar Strip. • SDI and MDI Applications	**10**
IX	**Data Access using ADO.NET** • Evolution of ADO.NET • Connected and Disconnect Classes • Establishing Connection with Database • Executing simple Insert, Update and Delete • Statements • DataReader and DataAdapter • What is Dataset? • Advantages of DataSet • Stored Procedures	**06**

Reference Books:

1. "Programming C#"- Jesse Liberty , O'Reilly Press.
2. "Professional C#"-Robinson et al, Wrox Press, 2002.
3. "The Complete Reference: C#"-Herbert Schildt, Tata McGraw Hill.
4. "The Complete Reference: Ado.Net"- Jerke, Tata McGraw Hill.
5. 5."C# for programmer"-Deilte-Pearson

BCA Part - III

Semester- V

Course Code: Paper XI **Course Title: Computer Graphics**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I	**Introduction** – applications of computer graphics, operations of computer graphics, graphics software packages.	**04**
II	**Graphical input – output devices**- graphical input devices, graphical output devices, raster scan video principles- raster scan monitors, color raster scan systems, plasma panel display, LCD panels, hard copy raster devices. Random scan devices- monitor tube displays, plotters.	**10**
III	**Scan conversion** – scan conversion methods, polynomial method for line, polynomial method for circle, DDA algorithm for line, circle and ellipse, Bresenham's algorithm for line drawing and circle. Midpoint methods for line and circle, problems of scan conversion.	**10**
IV	**Scan conversion for solids**- solid areas or polygons, inside-outside test – odd even method, winding number method. Solid area filling algorithms- boundary fill algorithm, scan line fill algorithm, scan line seed fill algorithm, ordered edge list algorithm.	**10**
V	**2D geometrical transformations** – basic transformations- translation, rotation, scaling, homogeneous co-ordinate system – transformations in homogeneous notation, inverse of basic transformations, scaling about a reference point, rotation about an arbitrary point. Other transformations – reflection about any arbitrary line, shearing, combined transformation- computational efficiency, visual reality, inverse of combined transformation.	**10**
VI	**3D geometrical transformations**- basic 3D transformation- 3D translation, 3D scaling. 3D rotation, rotation about an arbitrary axis in space, other 3D transformations- 3D reflection, reflection about any arbitrary plane, 3D shearing	**06**
VII	**Projection** – introduction, parallel projection- orthographic projection, axonometric projection, oblique projection, perspective projection – standard perspective projection, vanishing points. Image formation inside a camera.	**04**
VIII	**2D viewing and clipping**- windows and viewports, viewing transformation, clipping of lines in 2D- cohen-sutherland clipping algorithm, midpoint subdivision method, polygon clipping – Sutherland – hogman polygon clipping.	**06**

Reference Book:

1. Computer Graphics, Multimedia and Animation by Malay K Pakhira
2. Computer Graphics, Donald Hearn, M. Pauline Baker, Prentice-Hall
3. Computer Graphics, Roy A. Plastock, Gordon Kalley, Schaum's Outlines, McGraw Hill

BCA Part - III

Semester- VI

Course Code: Paper XII **Course Title: Recent Trends in IT**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I.	**GREEN IT** **INTRODUCTION** Environmental Impacts of IT, Holistic Approach to Greening IT, Green IT Standards and Eco-Labelling, Enterprise Green IT Strategy , Green IT: Burden or Opportunity? **Hardware:** Life Cycle of a Device or Hardware, Reuse, Recycle and Dispose. **Software:** Introduction, Energy-Saving Software Techniques, Evaluating and Measuring Software Impact to Platform Power.	**10**
II.	**BIG DATA AND HADOOP** 1: Introduction to Big Data Topics - What is Big Data and where it is produced? Rise of Big Data, Compare Hadoop vs traditional systems, Limitations and Solutions of existing Data Analytics Architecture, Attributes of Big Data, Types of data, other technologies vs Big Data. 2: Hadoop Architecture and HDFS Topics - What is Hadoop? Hadoop History, Distributing Processing System, Core Components of Hadoop, HDFS Architecture, Hadoop Master – Slave Architecture, Daemon types - Learn Name node, Data node, Secondary Name node.	**10**
III.	**DATA SCIENCE** Definition, working, benefits and uses of Data Science, Data science vs BI, The data science process, Role of a Data Scientist, Populations and samples, Statistical modeling, probability distributions	**10**
IV.	**MACHINE LEARNING** **INTRODUCTION TO MACHINE LEARNING(8)** Why Machine learning, Examples of Machine Learning Problems, Structure of Learning, Learning versus Designing, Training versus Testing, Characteristics of Machine learning tasks, Predictive and descriptive tasks, Features: Feature types, Feature Construction and Transformation, Feature Selection.	**10**
V.	**CLOUD COMPUTING** **INTRODUCTION TO CLOUD COMPUTING (8)** Defining Cloud computing, Essential characteristics of Cloud computing, Cloud deployment model, Cloud service models, Multitenancy, Cloud cube model, Cloud economics and benefits, Cloud types and service scalability over the cloud, challenges in cloud NIST guidelines. **VIRTUALIZATION, SERVER, STORAGE AND NETWORKING** Virtualization concepts, types, Server virtualization, Storage virtualization, Storage services, Network virtualization, Service virtualization, Virtualization management, Virtualization technologies and architectures, Internals of virtual machine, Measurement and profiling of virtualized applications. Hypervisors: KVM, Xen, HyperV Different hypervisors and features.	**10**

VI.	**INTERNET OF THINGS** **INTRODUCTION** What is the Internet of Things? : History of IoT, About IoT, Overview and Motivations, Examples of Applications, Internet of Things Definitions and Frameworks : IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities	**10**

Reference Books:

1. San Murugesan, G. R. Gangadharan: Harnessing Green IT,WILEY 1st Edition-2013
2. Data science and big data analytics, EMC
3. Doing Data Science, *Rachel Schutt and Cathy O'Neil*
4. Introducing Data Science, Davy Cielen
5. Data Science for Business, Foster Provost and Tom Fawcett, O'Reilly.
6. Peter Flach: Machine Learning: The Art and Science of Algorithms that Make Sense of Data, Cambridge University Press, Edition 2012.
7. Hastie, Tibshirani, Friedman: Introduction to Statistical Machine Learning with Applications in R, Springer, 2nd Edition-2012.
8. Barrie Sosinsky, " Cloud Computing Bible", Wiley
9. Gautham Shroff, "Enterprise Cloud Computing", Cambridge.
10. Stefan Poslad, "Ubiquitous Computing: Smart Devices, Environments and Interactions" by John Wiley & Sons, 2011.
11. A.Shrinivasan, J.Suresh, "Cloud Computing: A practical approach for learning and implementation", Pearson
12. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
13. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3- 642-19156-5 e-ISBN 978-3-642-19157-2, Springer
14. Parikshit N. Mahalle& Poonam N. Railkar, "Identity Management for Internet of Things", River Publishers, ISBN: 978-87-93102-90-3 (Hard Copy)

BCA Part - III

Semester V

Course Code: Paper XIII **Course Title: Linux & Shell Programming**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I	**Introduction to Linux** History, Distributions, Features, Linux Architecture, Kernel, Types of Shells, Difference between Windows and Linux Working environments -KDE, GNOME , Xface4 etc	03
II	**Installation of Linux** Hardware requirement, Software requirements, Create partitions, Configuration of X system, Start-up configuration.	03
III	**Linux File System** File System, Hierarchy of File system, Devices and Drives in Linux, Mounting Devices File System parts- Boot Block, Super Block, Inode Block, Data Block	03
IV	**Users, Groups and Permissions** Create Users ,Create groups, Special groups, Assigning permissions to users and groups	05
V	**Commands, Utilities and File Management** Managing file and directories: mkdir, cd and pwd, ls, cat, more, less. Nested directories, File and Directory Operations: find, cp, mv, rm, ln etc. Filters: head, tail , pr, cut, paste , sort, uniq, grep, egrep, fgrep. Text Editors- vi, vim File and Directory permissions- chmod, chown, chgrp. Printing the files - lpr, lpq, lprm etc. Archive and File compression, Windows integration tools.	06
VI	**Shell Programming and Process Management** Shell Variables, Shell Scripts – Control and Loop structure, User defined commands, I/O and Redirection, Piping, Metacharacters Process Management : Shell process, Parent and children, Process status, System process, Multiple jobs in background and foreground, Changing process priority with nice. listing processes, ps, kill, Premature termination of process.	10
VII	**Disk management and System Administration** Boot Loaders-GRUB, LILO, Custom Loaders System administration – Common administrative tasks, Identifying administrative files, Configuration and log files, Chkconfig, Role of system administrator, Security Enhanced Linux. Configuration Apache and MySql, X Window, Communication.	10
VIII	**Linux Networking** Networking services and Configuration files, starting services, Network tools-ping, finger, traceroute, who, host, rlogin, slogin, rcp, rsh, ssh. Protocols and Services- SMB, FTP, DHCP, LDAP, NFS and NIS.	10

Reference Books:

1) Operating Systems by William Stallings(PHI)
2) Operating System by Achyut Godbole (TMH)
3) Linux the complete refrence by Richard Mathews(TMH)
4) Red Hat Linux :The Complete Reference by Peterson (TMH)
5) Unix Systems V 4 Concepts & Applications by Sumitabha Das
6) Using Linux by Bill Ball

BCA Part - III

Semester- VI

Course Code: Paper XIV **Course Title: Advanced Java**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I	**Servlet** • Introducing CGI • Introducing Servlet • Advantages of Servlet over CGI • Features of Servlet • Introducing Servlet API • Javax.servlet package • Javax.servlet.http package • Introducing Servlet • Advantages of Servlet over CGI • Features of Servlet • Servlet life Cycle • Init() • Service() • Destroy() • Working with GenericServlet and • HttpServlet • RequestDispatcher interface • Include() and forward() • Use of RequestDispatcher • Session in Servlet • Introducing session • Session tracking mechanism • Cookies • Advantages & disadvantages • use of cookies • Hidden form filed • Advantages & disadvantages • use of Hidden form filed • URL rewritten • disadvantages • use of URL rewritten • HttpSession • Advantages & disadvantages • use of URL HttpSession	**18**
II	**JSP** • Introduction to JSP • Advantages of JSP over Servlet • JSP architecture • JSP life cycle • Implicit objects in JSP- request, response, out, page, page Context, application,session, config, exception • JSP tag elements- Declarative, Declaration, scriplet, expression, action.	**18**

	• Java Bean- Advantages & Disadvantages, • Use Bean tag- setProperty and getProperty • Bean In Jsp • JSTL core tag: General purpose tag, • conditional tag, networking tag • JSTL SQL tags • JSTL formatting tags • JSTL xml tags • Custom tag: empty tag, body content tag, • iteration tag, simple tag • Introducing internationalization & Java: local class, ResourceBundle class	
III	**Hibernate** • Introduction Hibernate(HB) • Architecture of HB • Application of HB: HB with annotation, • HB web application • Inheritance mapping: Table per Hierarchy • (TPH), TPH using annotation, Table Per • Concrete (TPC), TPC using annotation, • Table Per Subclass (TPS), • TPS using annotation. • Collection mapping: • Mapping list, one to many by list, • one to many by bag, • one to many by set, one to many by map.	**12**
IV	**Spring** • Introduction to spring • Spring modules. • Spring application • Dependency injection: constructor Injection (CI), • CI dependant object, • CI with collection, • CI with map, • CI inheriting bean • Spring JDBC: JDBC template, • PreparedStatement, ResultsetExactor, • RowMapper, NamedParameter, • Simple JDBC template. • Spring with Hibernate	**12**

Reference Books:

1. "JDBC, Servlet and JSP Black Book"- Santosh Kumar K.
2. "Java EE Server programming"- Sharanam Shah and Vaishali Shah.
3. "Java Server Programming Black book"
4. "Hibernate"- Sharanam Shah & Vaishali Shah
5. "Spring Persistence with Hibernate"- Paul Tepper Fisher, Brian D Murphy.

BCA Part - III

Semester- VI

Course Code: Paper XV **Course Title: Dot Net Technology**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I	Introduction of Asp.Net • Evaluation of Asp.Net • Fundamentals of ASP.NET • Understanding architecture ASP.NET • Compilation Technique of ASP.Net • Application Location • Web Page and Web Site life cycle • ASP.Net Page Structure • Page Directives • Self-page and Cross page posting • Post back and View State concepts • Application Folders	**08**
II	Web Server Control • Creating ASP.NET Pages – Web Forms • Working with web controls – Standard • Control group, Rich Controls. • Different type of List controls • File Upload, AdRotator, MultiView, Calendar • Create Web User Control	**10**
III	Validation controls • Introduction of validation • Types of validation • Validation Controls • Validation Groups	**06**
IV	Master Pages & Themes • Need of Master Pages • Basics of master pages • Creating Master and Content pages • Programmatically assign master pages • Nested Master pages • Event ordering of master pages • Basic Themes and Skins • Creating and Using Themes • Defining multiple skins • Programmatically working with themes	**08**
V	Site Navigation • Site Navigation technique • Site Map Path, Tree View and Menu Control • Nesting sitemap file • Attach XML file to tree view and menu	**04**
VI	State Management • Introduction of state management • technique • Types of State Management technique	**04**

	• Client side and server side State Management	
VII	Personalization • Personalization Model • Creating Personalization Properties	**03**
VIII	AJAX • What is AJAX and need for AJAX • Client side and server side AJAX • Implementing AJAX with JavaScript • Using ASP.NET Ajax Control toolkit • Working with AJAX's Server side controls. • Script Manager, Script Manger Proxy, • Update panel, Update Progress, Timer	**06**
IX	Web Services • What is Web Service? • Understanding SOAP, WSDL, Proxy etc. • Creating Web services • How to consume web services • To build an Web Service application and Client	**05**
X	Storing and Retrieving Data with ADO.NET • Accessing Data with ADO.NET • Using Data Sets on Web Forms • Processing Transactions • Working with DML commands	**06**

Reference Books:

1. "Unlished Asp.Net "- Walther , SAMS Pearson.
2. "Professional ASP.Net"-Evjen, Sivkumar, Wrox Press.
3. "The Complete Reference: Asp.Net"-MacDonald, Tata McGraw Hill.
4. "The Complete Reference: Ajex"- Powell, Tata McGraw Hill.
5."Pro Asp.Net in C#"-MacDonald, Szpuszta-APress
6."Asp.Net Step by step"- George Shephera-Microsoft Press
8. "Professional Ajex"-Zakas, NxPeak, fawcett, Wrox Press
9. complete reference crystal reports-Geogre Peak

BCA Part – III

Semester- V

Course Code: Paper XVI **Course Title: Data Warehouse and Data Mining**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I	**Introduction to Data Warehouse** ✓ Difference between operational database systems and data warehouses. ✓ Data warehouse Characteristics, ✓ Data warehouse Architecture and its Components, ✓ Extraction – Transformation – Loading, Logical (Multi – Dimensional), ✓ Data Modelling - Schema Design, Star and Snow – Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi – Addictive, Non Addictive Measures; Fact – Less – Facts, ✓ Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture – ROLAP, MOLAP and HOLAP.	**12**
II	**Introduction to Data Mining** ✓ What is Data Mining, Difference between Database Management System, Data Warehouse and Data Mining ✓ KDD, Challenges, Data Mining Tasks, ✓ Need for Pre-processing the Data ✓ Data Summarization ✓ Data Cleaning ✓ Data Integration and Transformation, ✓ Data Reduction ✓ Discretization and Concept Hierarchy ✓ Generation ✓ Binaryzation ✓ Data Transformation; Measures of Similarity and Dissimilarity – Basics.	**12**
III	**Association Rule** ✓ problems Definition, ✓ Frequent Item Set Generation, ✓ The APRIORI Principle, Support and Confidence Measures, ✓ Association Rule Generation; APRIOIRI Algorithm, ✓ The Partition Algorithms, FP- Growth Algorithms, ✓ Compact Representation of Frequent Item set- Maximal Frequent Item Set, ✓ Closed Frequent Item Sets.	**10**

IV	**Classification** ✓ Problem Definition, ✓ General Approaches to solving a classification problem, ✓ Evaluation of classifiers, Classification Techniques, ✓ Decision Tree – Decision tree Construction, Methods for ✓ Expressing attribute test conditions, ✓ Measures for Selecting the Best Split, ✓ Algorithm for Decision tree Induction; Naive Bayes Classifier, ✓ Rule base classification ✓ Bayesaian Belief Networks; K – N earnest neighbor classification – Algorithm and Characteristics.	**10**
V	**Clustering** ✓ Problem Definition, Clustering Overview, ✓ Evaluation of Clustering Algorithms, Partitioning Clustering -K-Means Algorithm, K-Means Additional issues, ✓ PAM Algorithm; ✓ Hierarchical Clustering – Agglomerative Methods and divisive methods, ✓ Basic Agglomerative Hierarchical Clustering, Strengths and Weakness; ✓ Outlier Detection.	**10**
VI	**Application and trends in Data Mining** ✓ Spatial Data Mining ✓ Text Data Mining ✓ Multimedia Data Mining ✓ Web Data Mining ✓ Application of data mining	**06**

Reference Books:

1. Data Mining – Concepts and Techniques – Jiawei Han, Michelinen Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
2. Introduction to Data Mining, Pang – Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.
3. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
4. Data Warehouse Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.
5. Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press

BCA Part – III

Semester- VI

Course Code: Paper XVII **Course Title: Cryptography and Network Security**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I	Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks – Active and Passive, Security services, Security Mechanisms, A model for Network Security	08
II	Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks	15
III	Symmetric Key Cryptographic Algorithms: Algorithm Types and Modes, An overview of Symmetric Key Cryptography, DES, International Data Encryption Algorithm (IDEA), RC5, Blowfish, AES Asymmetric Key Cryptography: Brief History of Asymmetric Key Cryptography, An overview of Asymmetric Key Cryptography, The RSA Algorithm, Symmetric and Asymmetric Key Cryptography Together	15
	Digital Signatures: Introduction, Message digests, MD5, SHA-512,MAC, HMAC, Knapsack Algorithm, Elliptic curve Technology, ELGamal Algorithm. Internet Security Protocols: Secure Socket Layer/TLS, Secure Electronic Transaction, SSL versus SET, E-mail Security- PGP, S/MIME.	15
V	User Authentication and Kerberos: Authentication basics, Passwords, use of smart cards, Biometrics, Kerberos. Network Security: Firewalls, types of firewalls, IP Security Intrusion : Intruders, Audit Records, Intrusion Detection, honey pots.	07

Reference Books:

1. Atul Kahate Cryptography and Network Security, Tata McGraw-Hill, 2007
2. Behrouz A. Forouzan, Debdeep Mukhopadhyay: Cryptography and Network Security, 2nd Edition, Special Indian Edition, Tata McGraw-Hill, 2011.
3. Michael E. Whitman and Herbert J. Mattord: Principles of Information Security, 2nd Edition, Thomson, Cengage Delmar Learning India Pvt., 2012.
4. William Stallings: Network Security Essentials: Applications and Standards, 4th Edition, Pearson Education, 2012.

BCA Part – III

Semester- VI

Course Code: Paper XVIII **Course Title: Advanced Python**

Teaching Scheme: Theory 4 Lect./week **Total Marks: 100**

Unit No.	Description	No. of Lectures
I	Windows Applications using Tkinter GUI Programming GUI in Python, Advantages of GUI, Introduction to GUI library, Basic Operations using Tkinter, Root Window, Working with Containers: Frame, Canvas Layout Management, Events and Bindings, Font, Colors, drawing on Canvas (line, oval, rectangle, etc.) Widgets: Label, Button, Check button, Entry, List box, Message, Radio button, Text, Spinbox, Scrollbar, Menu etc. Writing Python Programs for GUI applications	15
II	**Web Application using Django** : What Is a Web Framework? The MVC Design Pattern, Django's History, Advantages of Django, Understanding Django environment, Installing Django, Setting Up a Database Django architecture, The Development Server, Django Commands Overview, Starting a Project, Django apps, Difference between app and project, The Project Structure, Setting Up Your Project, Create an Application Migration, Admin Panel. Views in Django, URL Routing, Template in Django, Models in Django, Forms in Django.	15
III	**XML**: Introduction to XML, XML Parser Architecture and API's, Parsing XML with SAX API's, Parsing XML with DOM API's	12
IV	**Network Programming:-** Introduction to Sockets Programming, Server Socket Methods, Client Socket Methods, IP Address, URL, TCP/IP Server, TCP/IP Client, Sending E-mail Application	12

Reference Books:

1. Beginning Django: Web Application Development and Deployment with Python-Daniel Rubio-Apress
2. Django Unleashed- Andrew Pinkham-SAMS
3. Practical Django Projects- James Bennett-Apress
4. Python GUI Programming with Tkinter- Alan D. Moore-Packt
5. Tkinter GUI Application Development H TSHOT - Bhaskar Chaudhary -Packt

Sample Assignments on Core Java

1. WAP to demonstrate the use of various data types.
2. WAP to print following pattern.
    a. A
    b. A B
    c. A B C
    d. A B C D
3. WAP which will check number for Armstrong, prime, palindrome & perfect number.
4. WAP USING arrays to sort player name along with timing of Athlete (sort using two dimensional array).
5. WAP to demonstrate the use of Access Control.(Public, private , protected).
6. WAP using static & non static data members.
7. WAP using Interface.
8. WAP to demonstrate use of Exception Handling.
9. WAP which will create user defined Exception.
10. WAP which will accept string and calculate how many vowels present in it.
11. WAP which will accept range of years from users and print leap years between them.
12. WAP to reverse the number.
13. WAP which will accept number and displays it in words.
    a. e.g.- If number-123 as one two three.(use switch).
14. WAP which will create following threads.
    a. Print even & odd numbers.
    b. Print Hello 15 times.
    c. Print the prime number.
15. WAP which will demonstrate overloading & Inheritance.
16. WAP to display the following pattern.
    a. *1
    b. **2
    c. ***3
17. WAP to show demo of parameterized constructor.
18. Create an Applet which contains one combo box for font name, one list box , for font size and three radio button for font style i.e. Bold, Italic and Normal.
    The applet also displays some string message by label.
    WAP such that user will be able to change the font type, font size and font style of the text display and label caption.
19. WAP to append the contents of one file with another file.
20. WAP to develop a calculator using Applet (functions showing addition, subtraction, Multiplication and Division.
21. WAP which will insert student records into database having fields roll no, name, marks of five subjects, total marks and percentage and display the same.

Sample Assignments on Visual Programming

1. WAP program to check entered number is even or odd. AP program to get number and display sum of digits.
2. WAP program to check whether entered year is leap year or not.
3. WAP program to display date in various formats.
4. WAP program to Illustrate the Use of Access Specifiers.
5. WAP to create sealed class.
6. WAP to perform boxing and unboxing operation.
7. WAP to demonstrate multilevel inheritance.
8. WAP to demonstrate single level inheritance.
9. WAP to demonstrate multilevel inheritance with virtual methods.
10. WAP to get lower bound and upper bound of an array.
11. WAP to demonstrate jagged array.
12. WAP to find Minimum and Maximum of numbers.
13. WAP to search elements of an array.
14. WAP to copy a section of one array to another.
15. WAP to demonstrate abstract properties.
16. WAP to implement delegates.
17. WAP to combine two delegates.
18. WAP to implement multicast delegate.
19. WAP to demonstrate DivideByZero Exception.
20. WAP to demonstrate Multiple exceptions.
21. WAP to create a file.
22. WAP to Read the Contents of File.
23. WAP to Create Directory.
24. WAP to implement BinaryReader.
25. WAP to Read Line from File until end of file is reached.
26. WAP to Design user interface using all windows controls.
27. WAP to design MDI application.
28. WAP to demonstrate ADO.NET.
29. WAP to demonstrate Insert, Update and Delete Statements.

Sample Assignments on Computer Graphics

1. Write a program to implement bouncing of a ball over a horizontal plane.
2. Program to create Pie Chart.
3. Program to create Bar Chart.
4. Program to display Circles in Circle.
5. Program to create smiling face.
6. Program to create National Flag.
7. Program to create Solar System.
8. Program to create an analog clock
9. Program to create a digital clock
10. Program to animate a Fan.
11. Program to animate a Flying Kite
12. Program to animate a Traffic light
13. Program to translate an object with respect to origin.
14. Program to rotate an object with respect to origin.
15. Program to scale an object with respect to origin.
16. Program to rotate an object with respect to arbitrary point.
17. Write a program to draw a line by using DDA algorithm. 1
8. Write a program to draw a line by using Bresenham's algorithm.
19. Write a program to draw a Midpoint Circle algorithm

Sample Assignments on Advance Java

1. Write a programme which demonstrates life cycle of Servlet
2. Write a programme by using GenericServlet
3. Write a programme by using HttpServlet
4. Write a Servlet programme to send request to another page
5. Write a Servlet programme to track the user by using (Cookies, URL-rewriting, Hidden form field & HttpSession)
6. Write Jsp programme which will display its life cycle
7. Write a Jsp programme by using its implicit objects like request, response, out, page, pageContext, application, session, config, exception
8. Write a Jsp programme which will use scriplet, expression and declarative tag.
9. Write a Jsp programme which will create bean and calculate simple interest
10. Write a Jsp programme to create bean to check account balance(from database)
11. Write a Jsp programme to insert data into database
12. Write a Jsp programme which will use JSTL core tag, JSTL SQL tags, JSTL formatting tags, JSTL xml tags, Customtag: empty tag, body content tag, iteration tag, simple tag
13. Write a programme to display a message in different languages (use java internationalization)
14. Write a simple Hibernate programme
15. Write a HB with annotation
16. Write a HB web application
17. Write a HB Inheritance mapping: Table per Hierarchy(TPH), TPH using annotation, Table Per Concrete (TPC), TPC using annotation, Table Per Subclass (TPS), TPS using annotation. Collection mapping: Mapping list, one to many by list, one to many by bag, one to many by set, one to many by map.
18. Write simple Spring programme.
19. Write a Spring programme to show Dependency injection: constructor Injection (CI),CI dependant object, CI with collection, CI with map, CI inheriting bean
20. Write a Spring Spring JDBC programme using : JDBC template, PreparedStatement, ResultsetExactor,RowMapper, NamedParameter, Simple JDBC template. Spring with Hibernate

Sample Assignments on Dot Net Technology

1. Write a JavaScript for Addition, Subtraction, Division, and Multiplication of two numbers.
2. Design Webpage for employee registration form using all HTML controls and CSS.
3. Design web page for simple calculator By using class. Command name property. Button event.
4. Design web page of online shopping form which used textbox, label, buttons, and all type list controls.
5. Design Application for cross page posting.
6. Design This year calendar with all holidays in red color.
7. Design web page for image map by using Both method.
8. Design Advertisement web page.
9. Design web page which uses Multiview & View control. Wizard control. File upload control
10. Design web page for all validation control & validation Groups.
11. Create nested master pages.
12. Design web site which uses all site navigation Control.
13. Design web page which shows list of employees in selected dept.
14. Create XML & it's styles Sheet file.
15. Create Master Detail Form.
16. Create web page demonstrate insert, update, delete and select record.
17. Create web page demonstrate insert record and find sum of sal using stored procedure.
18. Design web page for grid view control.
19. Design web page which shows 10 events in calendar control.
20. Design web page which demonstrate wizard control

Sample Assignment on Data Warehousing and Data Mining

1. Open any dataset in WEKA and write down the attributes in that dataset also write down its types.
2. Open iris dataset in weka. Apply each type of classification algorithm on dataset. Identify which is best classification algorithm for iris dataset.
3. Convert CSV file to ARFF file format.
4. Demonstrate supervised and unsupervised filter of preprocessor tab.
5. Open any data set and apply tree base classification algorithm on that dataset. Interpret the result.
6. Open any data set and apply Rule base classification algorithm on that dataset. Interpret the result.
7. Load the weather.nominal dataset. Demonstrate how to remove all instances in which the humidity attribute has the value high.
8. Load the iris data using the Preprocess panel. Evaluate C4.5 on this data using (a) the training set and (b) cross-validation. What is the estimated percentage of correct classifications for (a) and (b)? Which estimate is more realistic?
9. Find the glass dataset glass.arff and load it into the Explorer interface. Apply the unsupervised discretization filter in the two different modes (equal-width (the default) and equal-frequency discretization.) explained previously.
10. Apply the ranking technique to the labor negotiations data in labor.arff to determine the four most important attributes based on information gain.
11. Demonstrate how to convert numeric to nominal, nominal to numeric, string to nominal and nominal to string.

Project Work

Course Code: Practical VII **Course Title: Major Project Work**
Internal Assessment: 20 **External Assessment: 50**

Instructions: Team size for major project not exceed than two students.

Equivalent Subject for Old SyllabusB.C.A. (Computer Science) - III (Semester –V and VI)

Semester-V		
Sr. No.	**Name of the Old Paper (w.e.f.2018-19)**	**Name of the New Paper (w.e.f.2021-2022)**
1	Core Java	Core Java (Sem-V)
2	Visual Programming	Visual Programming (Sem-V)
3	Linux and Shell Programming	Linux and Shell Programming (Sem-V)
4	Computer Graphics	Computer Graphics (Sem-V)
5	Data Warehouse and Data Mining	Data Warehouse and Data Mining (Sem-VI)
6	Theory of Computation	**No Equivalence**
Semester-VI		
Sr. No.	**Name of the Old Paper (w.e.f.2018-19)**	**Name of the New Paper (w.e.f.2021-2022)**
1	Advanced Java	Advanced Java (Sem-VI)
2	Dot Net Technology	Dot Net Technology (Sem-VI)
3	Recent Trends in IT	Recent Trends in IT (Sem-V)
4	Cryptography and Network Security	Cryptography and Network Security(Sem-VI)
5	System Programming	**No Equivalence**