Rayat Shikshan Sanstha's

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KARMAVEER BHAURAO PATIL MAHAVIDYALAYA, PANDHARPUR
(AUTONOMOUS COLLEGE)
Pandharpur- 413304

Third Year Syllabus under Autonomy

NAAC Reaccredited 'A+' grade, CGPA: 3.51
Granted under FIST-DST and the Best College

Affiliated To
Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Program: B.C.A. – III
Semester: V and VI

Pattern: Choice Based Credit System (CBCS)

Syllabus to be implemented from June, 2021 onwards

HEAD
Dept of B.C.A
K.B.P Mahavidyalaya
Pandharpur

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
(Autonomous)
Pandharpur-413304(Maharashtra)

Syllabus for Approval		
Sr.No.	Headings	Particulars
1	Class	B.C.A. –III
2	Eligibility for Admission	Passing B.C.A-II
3	Name of the Course	B. C. A.
4	Passing Marks	40
5	Evaluation	80 marks for semester +20 marks for internal evaluation
6	No. of Years/Semesters	02
7	Level	U.G.
8	Pattern	Semester
9	Status	Revised
10	To be implemented from Academic year	2021-2022

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
(Autonomous)
Pandharpur-413304(Maharashtra)

Syllabus for B.C.A. - III
Choice Based Credit System (CBCS) Syllabus
June, 2021

Structure of the Course:

1. B.C.A. course in Faculty of Science has total of six (6) semesters for three (3) years.
2. B.C.A..-III comprises of total two (2) semesters. Each semester will have Six (6) theory papers in that five (5) papers of 80 marks and one(1) paper 40 marks each for semester end examination (SEE) and five(5) papers for 20 marks and one (1) paper for 10 marks continuous internal evaluation (CIE) which includes one of the evaluation methods such as group discussion, seminar, unit test, quiz, etc. in each semester.
3. Skill Enhancement Courses for both Semester-V and Semester –VI.
4. At the end of academic year i.e. semester VI the practical examination will be conducted (Annual). The weightage of practical is 320 marks for annual practical examination and 80 marks for continuous internal evaluation.
5. Title, distribution of marks for each paper is as follows:

Semester	Type and Code of the Paper		Title of Paper	Hrs/Week		TotalMarksper paper	UA	CA	Credits
	Type	**Code**		**L**	**P**				
	Core Courses (Compulsory Papers								
V	AECC	KBP-S-BCA-3501	English (Business English)	4	-	50	40	10	2.0
	CC 1A	KBP-S-BCA-3502	Core Java	4	-	100	80	20	4.0
	CC 2A	KBP-S-BCA-3503	Visual Programming	4	-	100	80	20	4.0
	CC 3A	KBP-S-BCA-3504	Recent Trends in IT	4	-	100	80	20	4.0
	DSE: Discipline Specific Elective Paper (Any One)								
	DSE 1	KBP-S-BCA-3505	Computer Graphics	4	-	100	80	20	4.0
	DSE 2	KBP-S-BCA-	UML	4	-	100	80	20	4.0

		3505							
	SEC: Skill Enhancement Course (Any One)								
	SEC 3	KBP-S-BCA-3506	Linux and Shell Programming	4	-	100	80	20	4.0
	SEC 3	KBP-S-BCA-3506	Mobile Applications	4	-	100	80	20	4.0
		Total(Theory)		**24**	-	**550**	**440**	**110**	**22.0**
	Core Courses (Compulsory Papers								
VI	AECC	KBP-S-BCA-3601	English (Business English)	4	-	50	40	10	2.0
	CC 1 B	KBP-S-BCA-3602	Advanced Java	4	-	100	80	20	4.0
	CC 2 B	KBP-S-BCA-3603	Dot Net Technology	4	-	100	80	20	4.0
	CC 3 B	KBP-S-BCA-3604	Data Warehouse and Data Mining	4	-	100	80	20	4.0
	DSE: Discipline Specific Elective Paper (Any One)								
	DSE 2	KBP-S-BCA-3605	Cryptography and Network Security	4	-	100	80	20	4.0
	DSE 3	KBP-S-BCA-3605	Theory of Computation	4	-	100	80	20	4.0
	SEC: Skill Enhancement Course (Any One)								

	SEC 4	KBP-S-BCA-3606	Advanced Python	4	-	100	80	20	4.0
	SEC 4	KBP-S-BCA-3606	Multimedia and Web Design	4	-	100	80	20	4.0
		Total(Theory)		**24**	-	**550**	**440**	**110**	**22.0**
	Practical								
	DSE 1A &1B	KBP-S-BCA-P3	Practical On Core Java and Advanced Java	-	5	100	80	20	4.0
	DSE 1A &1B		Practical on Visual Programming and .Net Technology	-	5	100	80	20	4.0
	DSE 1A &1B		Practical on Computer Graphics And DM & DW	-	5	100	80	20	4.0
	DSE 1A &1B		Project	-	5	100	80	20	4.0
		Total (Practicals)		-	**20**	**400**	**320**	**80**	**16**
	Grand Total			**48**	**20**	**1500**	**1200**	**300**	**60**

DSE : Discipline Specific Elective Section
SEC : Skill Enhancement Course
AECC: Ability Enhancement Course

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Semester–V

Paper Code: - KBP-S-BCA-3502
Total Marks: - 100
Total Credits: - 4

Subject: - Core Java
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be able to use the Java SDK environment to create, debug and run simple Java programs.
- To learn how to design a graphical user interface (GUI) with Java Swing.
- To learn how to extend Java classes with inheritance and dynamic binding.
- To understand how to design GUI components with the Java Swing API.
- To learn how to read and write files in Java.

Unit:- I 1. Introduction to Java Programming 09

Overview of Java, Features of Java as programming language/Platform, JDK Environment and Tools

2.Java Programming Fundaments

Data types, Variables, Operators, Keywords, Naming Conventions, Structure of Java Program, Flow Control-Decision, Iterations, Arrays

3. 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.

Unit:-II 11

1.Inheritance & Polymorphism

Access/Scope specifiers protected, Super, extends, single, multiple inheritance, Method overriding, Abstract classes & ADT, 'final' keyword, Extending interfaces

2.Exception Handling

Exceptions and Types, try, catch and finally block, Throw & throws statement, user-defined exceptions

Unit:-III Threading 10

Java thread lifecycle, Thread class & runnable interface Thread priorities & synchronization, Usage of wait & notify

Unit:-IVJava I/O 10

Java I/O package, byte & character stream, Reader & writer, filereader & filewriter

Unit:-V Event Programming 10

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

Unit;-VIJDBC

Introduction to JDBC, Feature & Architecture of JDBC, Types of drivers, its advantage & disadvantage, JDBC Statements & Methods: statement, PreparedStatement, CallableStatement, execute(), executeQuery(), executeUpdate(), Working with Resultset interface, Working with Resultset Metadata

Outcomes:-

- Apply object oriented programming concepts.
- To develop and utilize package and interfaces in a Java program.
- Utilize graphical user interface in Java programs.
- Create applets.

Reference Books:

1. Java 2 for professional developers [byMichaelMorgen]
2. Jdbc, Servlets & JSP black book [by Santosh kumar K.Kogent SolutionInc.]
3. Core Java Vol 1 and Vol 2 [by Cay.S.Horstmann,GrayCornell]
4. Java The complete Reference [by Herbert Schildt]

Paper Code: - KBP-S-BCA-3503
Total Marks: - 100
Total Credits: - 4

Subject: - Visual Programming
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- Develop correct, well-documented programs using the C# programming language;
- learn to develop object-oriented programs using C# classes and objects;
- learn to use Windows Forms and WPF to create GUI-based programs

Unit:- I Introduction to Dot.Net Framework 08

Introduction to DOTNET, DOTNET 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

Unit:-II Introduction to C# 10

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

nit:-III 14

1.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

2. 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

Unit:-IV 12

1. 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, Directory Info classes

2. Delegates

Introduction of Delegation, Types of delegate, Anonymous Methods

3.Collections & Generics

Collection classes : ArrayList, Hashtable, stack, queue.Writing custom generic classes, Working with Generic Collection Classes

Unit:-V Windows Forms 10

Controls : Common control Group, Data control Group, Dialog control Group, Container control Group, Menus and Context Menus : MenuStrip, ToolbarStrip, SDI and MDI Applications

Unit:-VIData Access using ADO.NET 06

Evolution of ADO.NET, Connected and Disconnect Classes, Establishing Connection with Database, Executing simple Insert, Update and Delete, Statements, Data Reader and Data Adapter, What is

Dataset? Advantages of DataSet, Stored Procedures

Outcomes:-

- To construct knowledge of the structure and model of the programminglanguage C # (note)
- Make use of the programming language C # for various programmingtechnologies (understanding)
- To develop software in C # (application)
- To propose the use of certain technologies by implementing them inthe C # programming language to solve the given problem(synthesis)

ReferenceBooks:

1. "ProgrammingC#"-JesseLiberty,O'ReillyPress.
2. "ProfessionalC#"-Robinsonetal,WroxPress,2002.
3. "TheCompleteReference:C#"-HerbertSchildt,TataMcGrawHill.
4. "TheCompleteReference:Ado.Net"-Jerke,TataMcGrawHill.
5. 5."C#forprogrammer"-Deilte-Pearson

Paper Code: - KBP-S-BCA-3504
Total Marks: - 100
Total Credits: - 4

Subject: - Recent Trends in IT
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- Developed a product or process by applying knowledge of programming, web, database, human computer interaction, networking and security tools
- Participated effectively as a member of a development team and undertaken leadership roles when appropriate
- Made positive contributions to community and society by applying skills and abilities learned during undergraduate program in information technology
- Made decisions related to work that demonstrate understanding of the importance of being an ethical computing professional

Unit:- I GREEN IT INTRODUCTION 10

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.

Unit:-II BIG DATA AND HADOOP 10

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.

Unit:-III DATA SCIENCE 10

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

Unit:-IV MACHINE LEARNING 10

INTRODUCTION TO MACHINE LEARNING

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

Unit:-V CLOUD COMPUTING

1. INTRODUCTION TO CLOUD COMPUTING 10

Defining Cloud computing, Essential characteristics of Cloud computing, Cloud deployment model, Cloud service models, Multi tenancy, Cloud cube model, Cloud economics and benefits, Cloud

types and service scalability over the cloud, challenges in cloud NIST guidelines.

2. 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, Hyper V Different hyper visors and features.

Unit:-VI INTERNET OF THINGS 10

INTRODUCTION What is the Internet of Things? : History of IoT, About IoT, Overview and Motivations,ExamplesofApplications,InternetofThingsDefinitionsandFrameworks:IoTDefinitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities

Outcomes:-

- To develop and analyze quality computer applications by applying knowledge of software engineering, algorithms, programming, databases and networking.
- To build advanced knowledge and professional development in the field of information technology.

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.

Paper Code: - KBP-S-BCA-3505
Total Marks: - 100
Total Credits: - 4

Subject: - Computer Graphics
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- Have a basic understanding of the core concepts of computer graphics.
- Be capable of using OpenGL to create interactive computer graphics.
- Understand a typical graphics pipeline.
- Have made pictures with their computer.

Unit:- I 1.Introduction 14

applications of computer graphics, operations of computer graphics, graphics software packages

2.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.

Unit:-IIScan conversion 10

scan conversion methods, polynomial method for line, polynomial method for circle, DD Algorithm for line, circle and ellipse, Bresenham's algorithm for line drawing and circle. Midpoint methods for line and circle, problems of scan conversion

Unit:-IIIScan conversion for solids 10

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.

Unit:-IV2D geometrical transformations– 10

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 combines' transformations.

Unit:-V 1.3D geometrical transformations – 10

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

2.Projection –

introduction, parallel projection – orthographic projection, axonometric projection, oblique projection, perspective projection – standard perspective projection, vanishing points. Image formation inside a camera.

Unit:-VI2D viewing and clipping – 06

window sand view ports, viewing transformation, clipping of lines in 2D- cohen-sutherland clipping algorithm, midpoint subdivision method, polygon clipping–Sutherland–hogman polygon clipping.

Outcomes:-

- To explain the core concepts of computer graphics, including viewing, projection, perspective, modelling and transformation in two and three dimensions.
- To apply the concepts of colour models, lighting and shading models, textures, ray tracing, hidden surface elimination, anti-aliasing, and rendering.
- To explain the fundamentals of animation, parametric curves and surfaces, and spotlighting.
- To identify a typical graphics pipeline and apply graphics programming techniques to design and create computer graphics.

ReferenceBook:

1. ComputerGraphics,MultimediaandAnimationbyMalayKPakhira
2. ComputerGraphics,DonaldHearn,M.PaulineBaker,Prentice-Hall
3. ComputerGraphics,RoyA.Plastock,GordonKalley,Schaum'sOutlines,McGrawHill

Paper Code: - KBP-S-BCA-3505
Total Marks: - 100
Total Credits: - 4

Subject: - UML
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- The importance of modeling in the software development life cycle
- The UML notation and symbols
- The object-oriented approach to analyzing and designing systems and software solutions
- How to Employ the UML notation to create effective and efficient system designs

Unit – IObject Oriented Design and Modeling: 10
Object Oriented Fundamentals, Objects and object classes, object oriented design process, importance of modeling, principles of modeling, object oriented modeling.

Unit – IIIntroduction to UML: 10
Conceptual model of UML, building blocks of UML, Mechanisms in UML, architecture, software development life cycle.

Unit – III 10
1.Basic Structural Modeling: Classes, relationships, common mechanisms, class and object diagrams.

2.Advanced structural Modeling: Advanced classes, advanced relationships, Interfaces types and roles, packages, instances and object diagrams.

Unit – IVCollaboration Diagrams and Sequence Diagrams: 10
Terms, concepts and depicting a message in collaboration diagrams. Terms and concepts in sequence diagrams, Difference between collaboration and sequence diagram Depicting synchronous messages with / without priority call back mechanism.

Unit – V 10
1.Basic behavioral modeling: Interactions use cases, Use Case Diagrams, Interaction Diagrams and activity diagrams.

2.Advanced behavioral modeling: Events and signals, state machines, process and threads, time and space, state chart diagrams.

Unit – VIArchitectural Modeling: 10
Terms, Concepts, examples, Modeling techniques for component diagrams and deployment diagrams.

Outcomes:-

- To explain OOAD concepts and various UML diagrams
- To select an appropriate design pattern
- To explain domain models and conceptual classes
- To compare and contrast various testing techniques
- To construct projects using UML diagrams

Reference Books:

1. The Unified Modelling Language User Guide: Grandy Booch, James Rumbough, Ivar Jacobson, Pearson Education 2002.
2. Software Engineering Sixth Edition: Ian Sommerville, Pearson Education. 2003.
3. Fundamentals of Object-oriented Design in UML: Meilir Page-Jones, Larry L. Constantine, Addison Wesley, 2000

Paper Code: - KBP-S-BCA-3506
Total Marks: - 100
Total Credits: - 4

Subject: - Linux and Shell Programming
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- List special characters and methods of preventing the shell from interpreting these characters
- Describe a simple command
- Understand command-line syntax and run commands that include options and arguments
- Explain how the shell interprets the command line
- Redirect output of a command to a file, overwriting the file or appending to it
- Redirect input for a command so it comes from a file
- Run commands in the background

Unit:- I 06

1. Introduction to Linux

History, Distributions, Features, Linux Architecture, Kernel, Types of Shells, Difference between Windows and Linux Working environments-KDE,GNOME,Xface4 etc

2. Installation of Linux

Hardware requirement, Software requirements, Create partitions, Configuration of X system, Start-up configuration.

Unit:-II 08

1. 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

2. Users, Groups and Permissions

Create Users, Create groups, Special groups, Assigning permissions to users and groups

Unit:-IIICommands, Utilities and File Management 06

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

Unit:-IVShell Programming and Process Management 10

Shell Variables, Shell Scripts –Control and Loop structure, User defined commands, I/O and Redirection, Piping, Meta characters
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.

Unit:-VDisk management and System Administration 10

Boot Loaders- GRUB, LILO, Custom Loaders System administration–Common administrative tasks, Identifying administrative files, Configuration and log files, Chk config, Role of system administrator, Security Enhanced Linux. Configuration Apache and MySql, X Window, Communication.

Unit:-VILinux Networking 10

Networking services and Configuration files, starting services. Network Tools – ping, finger, trace route, who, host, rlogin, slogin, rcp, rsh, ssh. Protocols and Services- SMB,FTP,DHCP,LDAP, NFS and NIS.

Outcomes:-

- To perceive the basic set of commands and utilities in Linux/UNIX systems.
- To discover software for Linux/UNIX systems.
- To determine the important Linux/UNIX library functions and system calls.
- To discuss the inner workings of UNIX-like operating systems.

ReferenceBooks:

1) OperatingSystemsbyWilliamStallings(PHI)
2) OperatingSystembyAchyutGodbole(TMH)
3) LinuxthecompletereferencebyRichardMathews(TMH)
4) RedHatLinux:TheCompleteReferencebyPeterson(TMH)
5) UnixSystemsV4Concepts&ApplicationsbySumitabhaDas
6) UsingLinuxbyBillBall

Paper Code: - KBP-S-BCA-3506
Total Marks: - 100
Total Credits: - 4

Subject: - Mobile Applications
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- Recognizes mobile computing platforms and mobile computing
- Recognizes smart devices
- Recognizes mobile development environments.
- Explains the basic concepts of Android phone features and capabilities

Unit:- I Event Driven Programming: 08

UI event loop, Threading for background tasks, Outlets / actions, delegation, notification, Model View Controller (MVC) design pattern.

Unit:- II Mobile application issues: 08

limited resources (memory, display, network, file system), input / output (multi-touch and gestures), sensors (camera, compass, accelerometer, GPS)

Unit:- IIIDevelopment tools: 08

Apple iOS toolchain: Objective-C, Xcode IDE, Interface Builder, Device simulator.

Unit:- IVFrameworks: 08

Objective-C and Foundation Frameworks, Cocoa Touch, UIKit, Others: Core Graphics, Core Animation, Core Location and Maps, Basic Interaction.

Unit:- V 14

1.Common UI's for mobile devices: Navigation Controllers, Tab Bars, Table Views, Modal views, UI Layout.

2.Data Persistence: Maintaining state between application invocations, File system, Property Lists, SQLite, Core Data

Unit:- VI 14

1.Remote Data-Storage and Communication: "Back End" / server side of application, RESTful programming, HTTP get, post, put, delete, database design, server side JavaScript / JSON

2.Code signing: security, Keychain, Developers and App Store License Agreement

Outcomes:-

- To identify various concepts of mobile programming that make it unique from programming for other platforms,
- To Judge mobile applications on their design pros and cons,
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- To create applications to the Android marketplace for distribution.

Books Recommended:

1. Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, Android SDK 3 for Dummies, Wiley, 2011.
2. Valentino Lee, Heather Schneider, and Robbie Schell, Mobile Applications: Architecture,

Design, and Development, Prentice Hall, 2004.
3. Brian Fling, Mobile Design and Development, O'Reilly Media, 2009. Maximiliano
4. Firtman, Programming the Mobile Web, O'Reilly Media, 2010.
5. Christian Crumlish and Erin Malone, Designing Social Interfaces, O'Reilly Media, 2009.

Semester-VI

Paper Code: - KBP-S-BCA-3602
Total Marks: - 100
Total Credits: - 4

Subject: - Advanced Java
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

- Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
- Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
- Design and develop Web applications
- Designing Enterprise based applications by encapsulating an application's business logic.
- Designing applications using pre-built frameworks

Unit:- IServlet 10

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 Generic Servlet and HttpServlet, RequestDispatcher interface, Include() and forward(), Use of Request Dispatcher.

Unit:- II Session in Servlet 08

Introducing session, Sessiontrackingmechanism, Cookies, Advantages&disadvantages, useofcookies, Hiddenformfield, Advantages&disadvantages, useofHiddenformfield, URLrewritten, disadvantages, useofURLrewritten, HttpSession, Advantages&disadvantages, useofURLHttpSession

Unit:-III JSP 10

IntroductiontoJSP, AdvantagesofJSPoverServlet, JSParchitecture, JSPlifecycle, ImplicitobjectsinJSP-request,response, out, page,pageContext,application,session,config,exception, JSPtagelements-Declarative,Declaration,scriplet,expression,action.

Unit:-IV JavaBean – 08

Advantages&Disadvantages,useBeantag – setPropertyandgetProperty, BeanInJsp, JSTLcoretag:Generalpurposetag,conditionaltag,networkingtag, JSTLSQLtags, JSTLformattingtags, JSTLxmltags, Customtag:emptytag,bodycontenttag,iterationtag,simpletag, Introducinginternationalization&Java:localclass,ResourseBundleclass

Unit:-IVHibernate 12

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

Unit:-V Spring 12

Introductiontospring, Springmodules.Springapplication, Dependencyinjection:constructorInjection(CI),CIdependantobject,CIwithcollection,CIwithmap,CIinheritingbean, SpringJDBC JDBCtemplate,PreparedStatement,ResultsetExactor,RowMapper,NamedParameter,SimpleJDBCtemplate,SpringwithHibernate.

Outcomes:-

- To create dynamic web pages, using Servlets and JSP.
- To make a resusable software component, using Java Bean.
- To developStateful, Stateless and Entity Beans.
- To design Java classes and object associations to relational database tables with Hibernate mapping files

ReferenceBooks:

1. "JDBC,ServletandJSPBlackBook"-SantoshKumarK.
2. "JavaEEServerprogramming"-SharanamShahandVaishaliShah.
3. "JavaServerProgrammingBlackbook"
4. "Hibernate"-SharanamShah&VaishaliShah
5. "SpringPersistencewithHibernate"-PaulTepperFisher,BrianDMurphy.

Paper Code: - KBP-S-BCA-3603 **Subject: - Dot Net Technology**
Total Marks: - 100 **Total Lectures: - 60**
Total Credits: - 4 **Teaching Scheme: - Th. 4 Lect./Week**

Objectives:-

- Development of console application
- Building windows application
- OOPs using C#.NET
- Learn data access mechanism provided .net
- Create and consume libraries
- Create a web application using .net
- Its integration with asp.net
- Developing the website & application

Unit:- I IntroductionofAsp.Net 08

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

Unit:-II Web Server Control 10

Creating ASP.NET Pages – Web Forms, Working with web controls – Standard control group, Rich Controls. Different type of List controls, FileUpload, AdRotator, MultiView, Calendar, Create WebUser Control

Unit:-III 14

1.Validation controls

Introduction of validation, Types of validation, Validation Controls, Validation Groups

2.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.

Unit:-IV 08

1. Site Navigation

Site Navigation technique, SiteMapPath, TreeView and Menu Control, Nesting sitemap file, Attach XML file to treeview and menu

2.State Management

Introduction of state management, technique, Types of State Management technique, Client side and server side State Management

Unit:-V 1.Personalization 09

Personalization Model, Creating Personalization Properties.

2.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. ScriptManager, ScriptMangerProxy, Updatepanel, UpdateProgress, Timer

Unit:-VII. WebServices 11

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.

2.Storing and Retrieving Data with ADO.NET

Accessing Data with ADO.NET, Using DataSets on WebForms, Processing Transactions, Working with DML commands.

Outcomes:-

- To perceive the Microsoft .NET Framework and ASP.NET page structure
- To design web application with variety of controls
- To take the data using inbuilt data access tools
- To utilise Microsoft ADO.NET to access data in web Application
- To develop secured web application

ReferenceBooks:

1. "UnlishedAsp.Net"-Walther,SAMSPearson.
2. "ProfessionalASP.Net"-Evjen,Sivkumar,WroxPress.
3. "TheCompleteReference:Asp.Net"-MacDonald,TataMcGrawHill.
4. "ProfessionalAjex"-Zakas,NxPeak,fawcett,WroxPress
5. Completereferencecrystalreports-GeogrePeak

Paper Code: - KBP-S-BCA-3604
Total Marks: - 100
Total Credits: - 4

Subject: - Data Warehouse & Data Mining
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- To introduce students to the basic concepts and techniques of Data Mining.
- To introduce a wide range of clustering, estimation, prediction, and classification algorithms.
- To introduce mathematical statistics foundations of the Data Mining Algorithms.
- To introduce basic principles, concepts and applications of data warehousing.

Unit:- I Introduction to Data Warehouse 12

Introduction to Datawarehouse, Difference between operational database systems and data warehouses. Datawarehouse Characteristics, Datawarehouse Architecture and its Components. Extraction–Transformation–Loading, Logical (Multi–Dimensional). DataModelling-Schema Design, Star and Snow–Flake Schema, Fact Consultation, Fact Table, Fully Addictive, Semi–Addictive, Non Addictive Measures; Fact Consultation, 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

Unit:-II Introduction to Data Mining 12

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.

Unit:-III Association Rule 10

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 Ittemset-Maximal Frequent ItemSet, Closed Frequent ItemSets.

Unit:-IV Classification 10

Problem Definition, General Approach esto 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 ; Naïve Bayes Classifier, Rule base classification, Bayesaian Belief Networks ; K–Nearnest neighbor classification–Algorithm and Characteristics.

Unit:-V Clustering 10

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;
OutlierDetection.

Unit:-VIApplication and trends in Data Mining 06

Spatial Data Mining, Text Data Mining, Multimedia Data Mining, Web Data Mining, Application of data mining

Outcomes:-

- To identify the key processes of data mining, data warehousing and knowledge discovery process.
- To perceive the basic principles and algorithms used in practical data mining and their strengths and weaknesses.
- To apply data mining techniques to solve problems in other disciplines in a mathematical way.

ReferenceBooks:

1. DataMining–ConceptsandTechniques–JiaweiHan,MichelinenKamber,MorganKaufmannPublishers.Elsevier.2Edition.2006.
2. Introduction toDataMining, Pang –Ning Tan, Vipin Kumar, MichaelSteinbanch. PearsonEducation.
3. DataMiningTechniques,ArunKPujari,3rdEdition,UniversitiesPress.
4. DataWarehouseFundamentals,PualrajPonnaiah,WileyStudentEdition.
5. DataMining,VikaramPudi,PRadhaKrishna,OxfordUniversityPress

Paper Code: - KBP-S-BCA-3605
Total Marks: - 100
Total Credits: - 4

Subject: - Cryptography & Network Security
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- Learn fundamentals of cryptography and its application to network security.
- Understand network security threats, security services, and countermeasures.
- Acquire background on well known network security protocols such as IPSec, SSL, and WEP.
- Understand vulnerability analysis of network security.
- Acquire background on hash functions; authentication; firewalls; intrusiondetection techniques

Unit:- ISecurity Concepts: 08

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

Unit:-II Cryptography Concepts and Techniques: 15

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

Unit:-III Symmetric Key Cryptographic Algorithms: 15

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

Unit:-IV Digital Signatures: 08

Introduction, Message digests, MD5, SHA-512,MAC,HMAC, Knapsack Algorithm, Elliptic curve Technology, ELGamal Algorithm.

Unit:-VInternet Security Protocols 07

Secure Socket Layer/TLS, Secure Electronic Transaction, SSL versus SET, E-mail Security- PGP, S/MIME.

Unit:-VIUser Authentication and Kerberos: 07

Authentication basics, Passwords, use of smart cards, Biometrics, Kerberos.

Network Security: Firewalls, types of firewalls, IP Security

Intrusion : Intruders, Audit Records, Intrusion Detection, honeypots.

Outcomes:-

- To apply various public key cryptography techniques
- To apply Hashing and Digital Signature techniques
- To perceive the various Security Applications
- To apply system level security applications

ReferenceBooks:

1. Atul Kahate Cryptography and Network Security, Tata McGraw-Hill, 2007
2. BehrouzA.Forouzan,DebdeepMukhopadhyay:CryptographyandNetworkSecurity,2nd Edition.SpecialIndianEdition, Tata McGraw-Hill,2011.
3. MichaelE.WhitmanandHerbertJ.Mattord:PrinciplesofInformationSecurity,2nd Edition,Thomson, CengageDelmarLearningIndiaPvt.,2012.
4. WilliamStallings:NetworkSecurityEssentials:ApplicationsandStandards,4th Edition,PearsonEducation,2012.

Paper Code: - KBP-S-BCA-3605
Total Marks: - 100
Total Credits: - 4

Subject: - Theory of computation
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- To give an overview of the theoretical foundations of computer science from the perspective of formal languages
- To illustrate finite state machines to solve problems in computing
- To explain the hierarchy of problems arising in the computer sciences.
- To familiarize Regular grammars, context frees grammar.

Unit:- I Introduction to the theory of computation: 08

Symbol, alphabet, sets, relations and functions, strings and languages, application of finite automata

Unit:- IIFinite state machines: 16

Finite automata definition and description, transition system, DFA, NFA, nfa to dfa conversion, equivalence of DFA and NFA ,minimization of finite automata, nfa with epsilon moves to nfa to dfa, finite automata with outputs, Moore machine, Melay machine ,equivalence between Moore and Melay machines.

Unit:- III Regular expressions and regular grammars: 10

Regular expressions, equivalence of regular expressions and FA.

Unit:- IVRegular sets and properties: 10

Pumping lemma for regular sets, closure properties of regular sets.

Unit:- VContext free languages: 16

Introduction, context free grammars, derivation trees, leftmost and rightmost derivations, ambiguity in CFG, simplification of CFG, normal forms-Chomsky normal form CNF, Greibach normal form GNF, dfa to right linear regular grammar, right linear grammar to dfa, chomsky classification for grammar, properties of context-free language.

Outcomes:-

- To utilize basic concepts of formal languages of finite automata techniques
- To design Finite Automata's for different Regular Expressions and Languages
- To construct context free grammar for various languages
- To solve various problems of applying normal form techniques, push down automata and Turing Machines

Reference Books:

1. Hopcroft, and Ullman, Introduction to Automata Theory, Languages and Computation, AddisonWesley.
2. Introduction to Languages and the theory of Computation John C. Martin, Tata McGraw-HillEdition
3. Introduction to Formal Languages, Automata theory and Computation Kamala Krithivasan, Rama R. Pearson Education
4. Theory of Computer Science – K.L.P. Mishra, N. Chandra Sekaran, PHI

Paper Code: - KBP-S-BCA-3606
Total Marks: - 100
Total Credits: - 4

Subject: - Advanced Python
Total Lectures: - 60
Teaching Scheme: - Th. 4 Lect./Week

Objectives:-

- Leverage OS services.
- Add enhancements to classes.
- Code graphical interfaces for applications.
- Create easy-to-use and easy-to-maintain modules and packages.
- Implement and run unit tests.
- Create multithreaded and multi-process applications.

Unit:- I Web Application using Django : 12

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.

Unit:-II XML and Networking: 12

Introduction to XML, XML Parser Architecture and API's, Parsing XML with SAX API's, Parsing XML with DOM API's

Unit:-III Network Programming:- 12

Introduction to Sockets Programming, Server Socket Methods, Client Socket Methods, IP Address, URL, TCP/IP Server, TCP/IP Client, Sending E-mail Application

Unit:-IVData Analytics: 06

Introduction to data Big Data, Introduction to NumPY and SciPY, Introduction to Pandas and MatPlotLib

Unit:-VData Science : 06

What is Data Science? Data Science Life Cycle? What is Data Analysis, Data Mining , Analytics vs Data Science

Unit:-VIInternet of Things: 12

Impact of the internet, What is IOT , History of IoT, How IoT Works?, The Future of IoT

Outcomes:-

- To explain basic principles of Python programming language
- To elaborate object oriented concepts
- To apply database and GUI applications.

ReferenceBooks:

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

Paper Code: - KBP-S-BCA-3606 **Subject: - Multimedia and Web Design**
Total Marks: - 100 **Total Lectures: - 60**
Total Credits: - 4 **Teaching Scheme: - Th. 4 Lect./Week**

Objectives:-

- Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.
- Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice.
- Develop skills in analyzing the usability of a web site.
- Understand how to plan and conduct user research related to web usability.
- Learn techniques of responsive web design, including media queries.

Unit:- I Multimedia : 12

Definition, Components, uses, applicationsMultimedia Input/Output Devices: scanner, camera, microphone, speaker, monitors, printers.

Unit:- II Multimedia Storage Devices: 12

CD ROMs, DVDs, Blue ray disk.

Unit:- IIIMultimedia Tools: 12

Sound editor, video editor, animator, authoring tools.

Unit:- IV Web Designing: 12

Concept of website, website as a communication resource. Internet, intranet and extranet, basic concepts related to website designing.

Unit:- V HTML: 12

Introduction to hypertext markup language (html) document type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, frames, use of CSS

Outcomes:-

- To make up Virtual Collaborating ability
- To utilize the social media effectively for productive use
- To analyze the critical thinking and innovative skills

Reference Books:

1. Scott Mitchell , Create your own website , SAMS Publication , 2008
2. Tay Vaughan, Multimedia : Making it work, Tata McGraw Hill, Seventh edition, 2006
3. J. Jeffcoate, Multimedia in Practice, Pearson Education, First Edition, 2007

Paper Code: - KBP-S-BCA-P3
Total Marks: - 400
Total Credits: - 16

Subject: - Practical
Total Lectures: - 240
Teaching Scheme: - Th. 20 Lect./Week

I. Sample Assignments on Core Java

1. WAPtodemonstratetheuseofvariousdatatypes.
2. WAPtoprintfollowingpattern.
   a. A
   b. A B
   c. A B C
   d. A B C D
3. WAPwhichwillchecknumberforArmstrong,prime,palindrome&perfectnumber.
4. WAPUSINGarraystosortplay enamealongwithtimingofAthlete(sortusingtwodimensionalarray).
5. WAPtodemonstratetheuseofAccessControl.(Public,private,protected).
6. WAPusingstatic&nonstaticdatamembers.
7. WAPusingInterface.
8. WAPtodemonstrateuseofExceptionHandling.
9. WAPwhichwillcreateuserdefinedException.
10. WAPwhichwillacceptstringandcalculatehowmanyvowelspresentinit.
11. WAPwhichwillacceptrangeofyearsfromusersandprintleapyearsbetweenthem.
12. WAPtoreversethenumber.
13. WAPwhichwillacceptnumberanddisplaysitinwords.
    a. e.g.-Ifnumber-123asonetwothree.(useswitch).
14. WAPwhichwillcreatefollowingthreads.
    a. Printeven&oddnumbers.
    b. PrintHello15times.
    c. Printtheprimenumber.
15. WAPwhichwilldemonstrateoverloading&Inheritance.
16. WAPtodisplaythefollowingpattern.
    a. *1
    b. **2
    c. ***3
17. WAPtoshowdemoofparameterizedconstructor.
18. CreateanAppletwhichcontainsonecomboboxforfontname,onelistbox,forfontsizeand threeradiobuttonforfontstylei.e.Bold,ItalicandNormal. Theappletalsodisplayssomestringmessagebylabel. WAPsuchthatuserwillbeabletochangethefonttype,fontsizeandfontstyleofthetextdisplayedaslabel caption.
19. WAPtoappendthecontentsofonefilewithanotherfile.
20. WAPtodevelopacalculatorusingApplet(functionsshowingaddition,subtraction,Multiplicationand Division.
21. WAPwhichwillinsertstudentrecordsintodatabasehavingfieldsrollno,name,marksoffivesubjects,totalmarksandpercentageanddisplaythesame.

II. Sample Assignments on Visual Programming

1. WAP program to check entered number is even or odd.
2. A Pprogram to getnumber and display sum of digits.
3. WAP program to check whether entered year is leap year or not.
4. WAPprogramtodisplaydateinvariousformats.
5. WAPprogramtoIllustratetheUseofAccessSpecifiers.
6. WAP to create sealed class.
7. WAPtoperformboxingandunboxingoperation.
8. WAPtodemonstratemultilevelinheritance.
9. WAPtodemonstratesinglelevelinheritance.
10. WAPtodemonstratemultilevelinheritancewithvirtualmethods.
11. WAPtogetlowerboundandupperboundofanarray.
12. WAPtodemonstratejaggedarray.
13. WAPtofindMinimumandMaximumofnumbers.
14. WAPtosearchelementsofanarray.
15. WAPtocopyasectionofonearraytoanother.
16. WAPtodemonstrateabstractproperties.
17. WAPtoimplementdelegates.
18. WAPtocombinetwodelegates.
19. WAPtoimplementmulticastdelegate.
20. WAPtodemonstrateDivideByZeroException.
21. WAPtodemonstrateMultipleexceptions.
22. WAPtocreateafile.
23. WAPtoReadtheContentsofFile.
24. WAPtoCreateDirectory.
25. WAPtoimplementBinaryReader.
26. WAPtoReadLinefromFileuntilendoffileisreached.
27. WAPtoDesignuserinterfaceusingallwindowscontrols.
28. WAPtodesignMDIapplication.
29. WAPtodemonstrateADO.NET.
30. WAP to demonstrate Insert, Update and Delete Statements.

III. 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
18. Write a program to draw a line by using Bresenham's algorithm.
19. Write a program to draw a Midpoint Circle algorithm

IV. Sample Assignments on Linux and Shell Programming

1. Write a shell script to find out the greatest among three inputs.
2. Write a shell script to calculate the net salary of an employee in a particular month considering various allowances (TA, DA, HRA) and deductions (INCOME TAX, PROVIDEND FUND) as: TA=15 percent of basic salary DA=2 percent of basic salary HRA=10 percent of basic salary INCOME TAX=5 percent of salary PROVIDEND FUND=10 percent of salary Choice Based Credit System Syllabus of B.Sc (Entire Computer Science)-II To be effective From 2020-2021
3. A departmental store announces its festival scheme to customers on cash payment. The scheme is as followsIf purchase amount is less than 1000 then Tax=2% and discount=10%. If purchase amount is greater than 1000 then Tax=5 % and discount=20%.
4. Write a shell script to check whether an input is a prime or not.
5. Write a shell script to find out the sum of series
6. Write a shell script to print Fibonacci series.
7. Write a shell script for Swapping of Two Numbers.
8. Write a shell script to calculate the area & perimeter of the rectangle, and the area & circumference of the circle.
9. Write a shell script to convert this temperature into Centigrade degrees.
10. Write a menu driven shell Script 1) Change the group & owner of a directory 2) Set permission read, write & remove execute of a file 3) To check a file is sorted.
11. Write a menu driven shell Script 1) Change directory 2) Display first 15 lines only 3) To remove repeated data from a file.
12. Write a menu driven shell Script 1) To locate all files named by bsc 2) User of system 3) Merge two files
13. Write a menu driven shell Script 1) To create hard link a file bsc to bcs file 2) Cut fields 2 & 3 from a bsc file 3) Create a new file
14. Write a shell Script to calculate simple interest and compound interest
15. Write a menu driven shell Script 1) To find out Factorial. 2) To find out given no is perfect or not. 3) To find out Armstrong or not.
16. Write a menu driven Script to make File and Directory Management Operations: Choice Based Credit System Syllabus of B.Sc (Entire Computer Science)-II To be effective From 2020-2021 1) Display Current directory 2) Make Directory 3) Edit a file 4) Copy a file 5) Remove a file 6) Move a file.
17. Write a Shell Script to check if a file is readable, writable and executable
18. Write a shell script to concatenate files.
19. Write a Shell Script to convert Decimal number into Binary
20. Write a shell script to display series: 1+4+27+256...

V. Software Lab based on Mobile Applications:

1. Installing Android Environment
2. Create Hello World Application
3. Sample Application about Android Resources
4. Sample Application about Layouts
5. Sample Application about Intents
6. Sample Application I about user interfaces
7. Sample Application about Animations
8. Make a Project based on above labs
9. Sample Application about Android Data
10. Sample Application about SQLite I
11. Sample Application about SQLite II
12. Project Presentation

VI. Sample Assignments on Advanced Java

1. Writeaprogrammewhichdemonstrateslifecycleofservlet
2. WriteaprogrammebyusingGenericServlet
3. WriteaprogrammebyusingHttpServlet
4. Write a Servlet programme to send request to another page
5. WriteaServletprogrammetotracktheuserbyusing(Cookies,URL-rewriting,Hiddenformfield&HttpSession)
6. WriteJspprogrammewhichwilldisplayitslifecycle
7. WriteaJspprogrammebyusingitsimplicitobjectslikerequest,response,out,page,page Context,application,session, config,exception
8. WriteaJspprogrammewhichwillusescriplet,expressionanddeclarativetag.
9. WriteaJspprogrammewhichwillcreatebeanandcalculatesimpleinterest
10. WriteaJspprogrammetocreatebeantocheckaccountbalance(fromdatabase)
11. WriteaJspprogrammetoinsertdataintodatabase
12. WriteaJspprogrammewhichwilluseJSTLcoretag,JSTLSQLtags,JSTLformattingtags,JSTLxmltags,Customtag:emptytag,bodycontenttag,iterationtag,simple tag
13. Writeaprogrammetodisplayamessageindifferentlanguages(usejavainternationalization)
14. WriteasimpleHibernateprogramme
15. WriteaHBwithannotation
16. WriteaHBwebapplication
17. WriteaHBInheritancemapping:TableperHierarchy(TPH),TPHusingannotation, TablePerConcrete(TPC),TPCusingannotation,TablePerSubclass(TPS),TPSusingannotation.Collectionmapping:Mappinglist,onetomanybylist,onetomanybybag,onetomanybyset,onetomanybymap.
18. WritesimpleSpringprogramme.
19. WriteaSpringprogrammetoshowDependencyinjection:constructorInjection(CI),CIdependantobject,CIwithcollection,CIwithmap,CIinheriting bean
20. Write a Spring Spring JDBC programme using : JDBC template, PreparedStatement,ResultsetExactor,RowMapper,NamedParameter,SimpleJDBC template.SpringwithHibernate

VII. 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

VIII. Sample Assignment on Advanced Python

1. Write a program to draw different shapes
2. Write a program to develop GUI applications
3. Write a program to show database connectivity usingMySQL to perform Insert, update and delete operations.
4. Write a program to implement Thread Synchronization.
5. Write a program to demonstrate use of XML file
6. Write a program to create simple Django app
7. Write a program to create simple Django project.
8. Write a program to create Django project which add, delete, update records.
9. Write windows application which demonstrate all layouts used in Tkinter.
10. Write windows application which demonstrate any 10 Tkinter controls.

IX. Sample Assignment on Data Warehousing and Data Mining

1. Build Data Warehouse and Explore WEKA
2. Perform data preprocessing tasks and Demonstrateperformingassociation rule mining on data sets
3. Unit-III Demonstrate performing classification on data sets
4. Unit-IV Demonstrate performing clustering on data sets
5. Unit-V Demonstrate performing Regression on data sets

i. Open any dataset in WEKA and write down the attributes in that dataset also write down its types.

ii. Open iris dataset in weka. Apply each type of classification algorithm on dataset. Identify which is best classification algorithm for iris dataset.

iii. Convert CSV file to ARFF file format.

iv. Demonstrate supervised and unsupervised filter of preprocessor tab.

v. Open any data set and apply tree base classification algorithm on that dataset. Interpret the result.

vi. Open any data set and apply Rule base classification algorithm on that dataset. Interpret the result.

vii. Load the weather.nominal dataset. Demonstrate how to remove all instances in which thehumidity attribute has the value high.

viii. Load the iris data using the Preprocess panel. Evaluate C4.5on this data using (a) the training set and (b) cross-validation. What is theestimated percentage of correct classifications for (a) and (b)? Which estimateis more realistic?

ix. Find the glass dataset glass.arff and load it into the Explorer interface. Apply theunsupervised discretization filter in the two different modes (equal-width (the default) and equal-frequencydiscretization.) explained previously.

x. Apply the ranking technique to the labor negotiations data inlabor.arff to determine the four most important attributes based on informationgain.

xi. Demonstrate how to convert numeric to nominal, nominal to numeric, string to nominal and nominal to string.

X. **Practical :- Multimedia and Web Design**

Practical exercises based on Open Office tools using presentation software, web design and development tools, image editing tools (Gimp) and animation tools such as Blender

1. Create an HTML document with the following formatting options:
    - I. Bold
    - II. Italics
    - III. Underline
    - IV. Headings (Using H1 to H6 heading styles)
    - V. Font (Type, Size and Color)
    - VI. Background (Colored background/Image in background)
    - VII. Paragraph
    - VIII. Line Break
    - IX. Horizontal Rule
    - X. Pre tag
2. Create an HTML document which consists of:
    - I. Ordered List
    - II. Unordered List
    - III. Nested List
    - IV. Image