Kadi Sarva Vishwavidhyalaya, Gandhinagar
BCA Semester VI
BCA 601 : APPLICATION DEVELOPMENT USING JAVA

Rationale: The Course provide the detail concept of different techniques for developing Java Programmes and even covers how to solve typical Java programming Problems, developing applets by understanding the useful concepts of Object Oriented Programming using Java & implementation of practical skills for future use.

Learning Outcomes: The Student Will be able to :
- Acquire knowledge of robust and platform independent features of java.
- Create multi threading applications,
- web based applications

Resource Required
- Projector

Sub Code	Subject Title	Teaching Scheme		Exam Scheme				
				Theory		Practical		Total
		Cr.	Hrs./Week	Internal	External	Internal	External	Marks
BCA 601	APPLICATION DEVELOPMENT USING JAVA	4	4	30	70	--	--	100

Course Content:

Unit 1: Introduction to Java and Class, Objects, Methods   **[25%]**
        Java History, OOPS concepts, Features of Java Language, How Java differs from C and C++, Java Program Structure, Java Virtual Machine, Constants, Variables, Data Types, JDK Tool kit, Defining a class, Method Declaration, Creating Objects, Accessing Class members, Constructors, Method Overloading, Inheritance

Text Book1: Page No 1 to 141

Unit 2: Interfaces & Packages [25%]

Final keyword (final class, final variable, final method), Abstract keyword (Abstract class, Abstract variable, Abstract method), Introduction to interface, Defining Interface, Implementing Interface, Multiple Inheritance, Java API Packages, Accessing and using a package, Rules for defining Package, Adding a class to a Package

Text Book1: Page No 181 to 201

Unit 3: Multithreading & Basics of Applet [25%]

Multithreading: Introduction, Creating Threads, Extending Thread class, implementing Runnable Interface, Life cycle of Thread, Stopping and Blocking Thread, Thread Priorities
Basics of Applet: Introduction to Applet, Difference between Application and Applet, Applet life cycle, Methods of building an Applet, Applet Tag

Text Book1: Page No 207 to 220, 244 to 253

Unit 4: GUI Programming using Applet [25%]

Graphics class: Displaying message on Applet, Graphics class and its functions (Drawing lines, Drawing circle, Drawing Rectangle), Use of Pre-define & User-define colors in Applet
AWT Component: Mouse Listener, Mouse Motion Listener, Key Listener, Action Listener, Introduction to UI Components (Label, Button, Check-box, Text Field, List)

Text Book1: Page No 270 to 282

Text Book
1) Programming with Java : E. Balagurusamy (TMH)

Reference Books
1) Complete Reference Java2 (4th Edition) : Schilidit H. (TMH)
2) Programming wit Java, By. Dr. N. N. Jani, Ms. Mital Vora. (Bharat Pub)

Question Paper Scheme:

University Exam :   **Duration 3 Hrs**   **Total Marks : 70**

Q.1-	Unit-I & II (Objective/Short questions)	11 Marks
Q.2-	Unit-I (Descriptive / Long questions)	12 Marks
Q.3-	Unit-II (Descriptive / Long questions)	12 Marks
Q.4-	Unit-III & IV (Objective/Short questions)	11 Marks
Q.5-	Unit-III (Descriptive / Long questions)	12 Marks
Q.6-	Unit-IV (Descriptive / Long questions)	12 Marks

Note: Que.2, Que.3, Que.5 and Que.6 must have at least 40% Internal Options (i.e. Attempt Any 3 out of 5)

Sample Questions

1) How to call one constructor from the other constructor?
2) What is method overriding in java ?
3) What is super keyword in java ?
4) Difference between method overloading and method overriding in java ?D
5) Difference between abstract class and interface ?
6) Why java is platform independent?
7) What is method overloading in java ?
8) What is difference between c++ and Java ?
9) What is JIT compiler ?
10) What is bytecode in java ?
11) Difference between this() and super() in java ?
12) What is a class ?
13) What is an object ?
14) What is method in java ?
15) What is encapsulation ?
16) Why main() method is public, static and void in java ?
17) Explain about main() method in java ?
18) What is constructor in java?
19) What is thread in java?
20) Difference between process and thread?
21) What is multitasking ?
22) Explain: Applet Life Cycle of Java.
23) Explain: Color class of Java
24) Explain: Applet Tag of Java.
25) Explain: DrawRect function with its Attributes.

Kadi Sarva Vishwavidyalaya, Gandhinagar
BCA Semester VI
BCA 602: EMERGING TRENDS AND TECHNOLOGY

Rationale: The goal of the course is to have the awareness of Emerging Trends and Technologies among the students and to understand the need, concepts and working of the new upcoming technologies in the real world scenario.

Learning Outcome: Students will be exposed to various Emerging Trends and Technologies such as Data Warehouse, Data Mining, Enterprise Resource Planning (ERP), Biometric Technology and Blockchain Technology.

Teaching and Evaluation Scheme: The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of internal examinations which consist of Term Work such as class test, quizzes, class participation, home assignments, presentation, Regular Attendance (i.e. Minimum 85%) and Mid-Term marks. Internal marks which consist of 30 (Term Work + Mid-Term Exams) marks and External marks which consist of 70 for University examination.

Sub Code	Subject Title	Teaching Scheme		Exam Scheme				
				Theory		Practical		Total
		Cr.	Hrs./Week	Internal	External	Internal	External	Marks
BCA 602	EMERGING TRENDS AND TECHNOLOGY	4	4	30	70	--	--	100

UNIT I: DATA WAREHOUSE AND DATA MINING (DW & DM)   [25%]

- **DATA WAREHOUSE (DW):** Introduction, Definition, Concepts, Characteristics, Advantages & Disadvantages, Components & Architecture, ETL Process, Data Mart, Functional Requirement, OLAP & OLTP.

- **DATA MINING (DM):** Introduction, Definition, Concepts, Knowledge Discovery Process, Architecture of Data Mining System, Techniques: Data Classification, Prediction, Data Clustering, Association Rule and Outlier Analysis, Major Issues, Latest Trends of Data Mining.

UNIT II: ENTERPRISE RESOURCE PLANNING (ERP) [25%]

- **ENTERPRISE RESOURCE PLANNING (ERP):** Basic ERP concepts, ERP Benefits, ERP and Related Technologies (Business Intelligence (BI), E-Commerce and E-Business, Business Process Reengineering (BPR), Supply Chain Management (SCM), Customer Relationship Management (CRM)), ERP Implementation Life Cycle, ERP Hidden Costs.

- **Overview of ERP Business Modules:** Functional/Business Modules in ERP Packages: Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials Management, Quality Management, Marketing and Sales Distribution and Service.

UNIT III: BIOMETRICS TECHNOLOGY [25%]

- **Biometrics Technology:** Introduction, Definition, Need, Biometric Characteristics, Different Biometrics Technologies, Comparison of Biometrics Technologies.

- **Fingerprint Identification System:** Introduction, Definition, Concepts, Components, Working of Fingerprint Technology, Strengths, Weaknesses, Applications.

- **Face Scan System:** Introduction, Definition, Concepts, Components, Face Detection; Working of Face Reorganization Technology; Strengths, Weaknesses, Applications.

- **Voice Recognition System:** Introduction, Definition, Concepts, Components, Working of Voice Recognition System, Strengths, Weaknesses, Applications.

UNIT IV: BLOCKCHAIN TECHNOLOGY [25%]

- **Blockchain**: Introduction, Definition, Concepts, Benefits, Evolution, Structure, Characteristics, Challenges, Domain specific Blockchain Applications, Blockchain Application Templates.

- **Blockchain Technology:** Key Blockchain Terminologies, Blockchain Types, Working of Blockchain Technology, Blockchain Stack overview: Decentralised computation platform – Ethereum, Decentralised Storage Platform – Swarm, Decentralised Messaging Platform – Whisper, Smart Contracts, Decentralised Applications (Dapps), Tools & Interface.

Reference Books
(1) An Introduction to Building the Data Warehouse, IBM Corporation Publication.

(2) Data Warehousing Fundamentals, Paulraj Ponniah, Wiley India Edition Publication.

(3) Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers an imprint of Elsevier.

(4) ERP Demystified, Alexis Leon, Second Edition, Tata McGraw Hill Publication.

(5) Biometric Theory, Methods and Applications, N. V. Boulgouris, Konstantinos N. Plataniotis, Evangelia Micheli-Tzanakou, Wiley India Edition Publication.

(6) Blockchain Applications A hands-On Approach, Arshdeep Bahga, Vijay Madisetti.

Question Paper Scheme:

University Exam :   **Duration 3 Hrs**   **Total Marks : 70**

Q.1-	Unit-I & II (Objective/Short questions)	11 Marks
Q.2-	Unit-I (Descriptive / Long questions)	12 Marks
Q.3-	Unit-II (Descriptive / Long questions)	12 Marks
Q.4-	Unit-III & IV (Objective/Short questions)	11 Marks
Q.5-	Unit-III (Descriptive / Long questions)	12 Marks
Q.6-	Unit-IV (Descriptive / Long questions)	12 Marks

Question Bank

UNIT I: DATA WAREHOUSE AND DATA MINING (DW & DM)

1. Define and answer the following terminologies as asked related to Data Warehouse and Data Mining (DW & DM):

1.1) Data Warehouse.

1.2) Data Mining.

1.3) Data Mart.

1.4) Give full form following: OLAP, OLTP, ETL, KDD.

2. Write Short Note on the following:

2.1) Characteristics of Data Warehouse.

2.2) Reasons for Growth of ERP Market.

2.3) Data Mart.

2.4) Applications of Data Mining.

3. Answer in Detail:

3.1) Architecture of Data Warehouse with Diagram.

3.2) Architecture of Data Mining System with Diagram.

3.3) ETL Process with Diagram.

3.4) Difference Between OLAP & OLTP.

3.5) Knowledge Discovery Process with Diagram.

3.6) Data Mining Techniques.

UNIT II: ENTERPRISE RESOURCE PLANNING (ERP)

1. Define and answer the following terminologies related to Enterprise Resource Planning:

1.1) Define Enterprise Resource Planning

1.2) Give full form following: BPR, SCM, MIS, DSS, EIS.

2. Write Short Note on the following:

2.1) Need & Evolution-A Pre-ERP Scenario

2.2) Reasons for Growth of ERP Market

2.3) Advantage of ERP.

2.4) Benefits of ERP.

2.5) Hidden Costs of ERP.

3. Answer in Detail:

3.1) ERP & Related Technologies

3.2) ERP Implementation Life Cycle with Diagram

3.3) Functional/Business Modules in ERP Packages

UNIT III: BIOMETRICS TECHNOLOGY

1. Define Biometric Technologies.

2. Write difference between various types of Biometric Technologies.

3. Explain Concept, Components, Working (with Diagram), Strength & Weakness, Applications

of the following Biometric Technologies:

3.1) Fingerprint Identification System.

3.2) Face Scan Systems.

3.3) Voice Recognition System.

UNIT IV: BLOCKCHAIN TECHNOLOGY

1. Define: Blockchain, Blockchain Technology.

2. Write a short note on Blockchain Technology for the Following :

2.1) Evolution

2.2) Structure

2.3) Characteristics

2.4) Benefits

2.5) Applications

2.6) Challenges

3. Explain the following:

3.1) Key Blockchain Terminologies.

3.2) Blockchain Types.

3.3) Working of Blockchain Technology

4. Write a detailed note on Blockchain Stack.

5. What do you mean by a Blockchain Application Templates? Explain.

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Kadi Sarva Vishwavidhyalaya, Gandhinagar
BCA Semester VI
BCA 603: APPLICATION DEVELOPMENT USING JAVA (P)

Rationale: The Course provide the detail concept of different techniques for developing Java Programmes and even covers how to solve typical Java programming Problems, developing applets by understanding the useful concepts of Object Oriented Programming using Java & implementation of practical skills for future use.

Learning Outcomes: The Student Will be able to :
- Acquire knowledge of robust and platform independent features of java.
- Create multi threading applications, web based applications

Teaching Scheme & Exam Scheme:

Sub Code	Subject Title	Teaching Scheme		Exam Scheme				
				Theory		Practical		Total
		Cr.	Hrs./Week	Internal	External	Internal	External	Marks
BCA 603	APPLICATION DEVELOPMENT USING JAVA (P)	2	2	--	--	15	35	50

Practical List

1) Write a Java program to create Class and Object
2) Write a Java program to print 1 to 10 using for loop
3) Write a Java program to print Odd numbers upto 100 using while loop
4) Write a Java program to print Even numbers upto 100 using do while loop
5) Write a Java program to print Numbers divisible by 7 up to 100
6) Write a Java program to demonstrate Default Constructor
7) Write a Java program to demonstrate Parameterised Constructor
8) Write a Java program to demonstrate Single Inheritance
9) Write a Java program to demonstrate Multievel Inheritance
10) Class Number has a variable x which is an integer number. Class Square is derived from class number which prints square of the given number and class Cube is derived from class Square which prints the cube of the integer number. Write a progrma to demonstrate the mechanism.
11) Write a program to demostrate "final" keyword
12) Write a program to demostrate "final" Class
13) Write a program to demostrate "abstract" keyword for function

14) Write a program to demostrate "abstract" keyword for Class
15) Write a program to demostrate concept of interface in java
16) Write a program to demostrate "implements" keyword in Java
17) Create a pacake "pkg" with a class "Myclass" with appropriate functions and use it in Java Program
18) Package "Calculate" has classes "sum" and "sub" with performs addition and subtraction of 2 integer variables using required functions respectively. Write a Java program to demonstrate this mechanism.
19) Write a program to demonstrate a Thread class.
20) Write a program to demonstrate a "sleep" method of Thread class
21) Write a program to demonstrate a Multiple threads in a same java program.
22) Write a program to demonstrate a Thread priorities.
23) Write a program to create a simple applet using Applet tag of java
24) Create an Applet and use drawRect() function to draw a Rectangle
25) Create an Applet and use drawLine() function to draw a Line
26) Create an Applet and use drawOval() function to draw a Oval
27) Create an Applet and show Indian Flag on it
28) Create an Applet and use MouseListener in it
29) Create an Applet and use ActionListener in it
30) Create an Applet and use AWT components in it.

❖ **Evaluation Scheme:**

Practical	Viva	Journal	Total
21	7	7	35

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Rationale: The goal of the course is to understand concept, working and Implementation of Emerging Trends and Technologies in the Data Warehouse and Data Mining (DW & DM) domain of the real world scenario.

Learning Outcomes: Students will be exposed to various Emerging Trends and Technologies of Data Warehouse and Data Mining.

Teaching Scheme & Exam Scheme:

Sub Code	Subject Title	Teaching Scheme		Exam Scheme				
				Theory		Practical		Total
		Cr.	Hrs./ Week	Internal	External	Internal	External	Marks
BCA 604	EMERGING TRENDS AND TECHNOLOGY (P)	2	2	--	--	15	35	50

Practical List

Data Mining Techniques Implementation on different Datasets using Open Source Data Mining Tool:

- Working with GUI Environment.: retrieve data, building the first process and running processes

- Classification Analysis: Importing data, downloading the data, adding data to the process, creating a connection to view results and executing the process.

- Filtering and Sorting data.

- Cluster Analysis: joining and grouping the datasets.

- Attributes Analysis: working, defining a new attribute and removing unnecessary attributes.

- Prediction Analysis :
  - o   Adding product details to transactions, defining attribute types and roles and defining the column to predict.
  - o   Building a survival prediction model, retrieve the titanic data, removing unnecessary attributes and building a decision tree model.

- Advance Data Handling: Preparing the Data, Removing attributes with Missing Values, Replacing Missing Values.
- Outlier Analysis: Preparing Data, Normalizing the attribute value ranges, Detect Outliers, removing Outliers.
- Exporting the Data, Writing Data to Files and Storing Data in the repository.

Evaluation Scheme:

Practical	Viva	Journal	Total
21	7	7	35

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Kadi Sarva Vishwavidhyalaya, Gandhinagar
BCA Semester VI
BCA 605 – PROJECT PHASE-II

Rationale:

The main objective behind this subject is to give practical exposure of the topics learnt in parts in various subjects of BCA course. It is an important part to get practical exposure by implementing the system in the field of choice.

Learning outcomes:

The students will be able to have hands-on exercises to carry out the Project Phase - II work using various platforms and project tools which will provide practical experience. The objectives are to:

- Implement what is learnt during course
- Get real-life experience by working in real practical world by project development.
- Enhance the ability to plan, analyze, design and development of the real life project.
- Understand the problems faced during project implementation and technical development.
- Enhance the problem solving ability by solving the real-time problems and create project for institute , society and IT-Industry.
- Learn team work and appreciate role of each of the team members.

Teaching and Evaluation Scheme:

The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of internal examinations consisting of 100 marks (continuous evaluation based on project work done throughout the semester: Internal Term Work which consist of 100 marks) and External marks which consist of 150 for viva-voice presentation on Project Work in University Examination.

Subject Code	Subject Title	Teaching Scheme		Exam Scheme			
		Credit	Practical/ Project	Practical / Project		Term Work Marks	Total
				Internal	External		Marks
BCA 605	Project Phase - II	10	10	40/100	60/150	100	250

INDEX – PHASE II

- TITLE OF PROJECT

- GROUP DETAILS

1. **SYSTEM ANALYSIS & DESIGN**

    1.1 DFDs (Context level , 1st level)
    1.2 2nd level / UML / CLASS diagram
    1.3 E-R Diagram (With Table Relationship and Table Types)
    1.4 Data Dictionary (With all detail entity , attributes , constraints (PK - FK) and remarks

Note: In case of any changes in User requirements, updated DFD's (Context level, 1st level), ERD and DD to be presented in the Final Report.

2. **SYSTEM IMPLEMENTATION AS DESIGN**

    2.1   SYSTEM DESIGNS OF AUTHENTICATION : SIGNUP & LOGIN FORM (SCREENS)
    2.2   SIGNUP & LOGIN FORM
    2.3   SYSTEM ADMINSTRATION DESIGNS : TRANSACTIONS , SEARCHING
    2.4   SYSTEM REPORTS AS ADMIN LEVEL - CUSTOMER LEVEL - OTHER REPORT AS PER NEED
    2.5   SYSTEM VALIDATIONS: VALIDATIONS FOR VARIOUS LEVEL (ADMIN , MANAGER , CLIENTS ...ETC)
    2.6   MISC. FEATURES LIKE CAPTCHA SENDING SMS, MAILIG, BILLING, OTP, ... ETC IN PROJECT

NOTE: The Final Project Report should comprise of BCA – 507 (PHASE I) & BCA 605 (PHASE II). (Both inclusive).

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Rationale: The main motive behind this subject is to give practical exposure of the topics learnt in parts in subjects of Hardware and Robotics included in BCA course. Project is an integral part of the BCA curriculum, which is carried out in the last semester. The students will design, develop and implement real systems which can be either extension or application of the courses learnt during BCA course.

Learning Outcomes: The student will be able to understand:

1. Basic components of Robots
2. Implementation technique of Robotics solutions
3. Project Based Learning

Teaching and Evaluation Scheme:

Subject Code	Subject Title	Teaching Scheme		Exam Scheme				Total Marks
		Cr.	Hrs/Week	Theory		Practical		
				Internal	External	Internal	External	
BCA 606	ROBOPEDIA-III	2	2	-	-	15	35	50

Course Content:

Robotic Projects   **[100%]**

Robotic Project based on the Areas pertaining to Artificial Intelligence, Machine Learning, Wireless Sensor Networks, Cognitive Computing, Cyber Security, Internet of Things.

Real life based Project titles to be studied, surveyed and implementation to be done as per the three phases given below.

Phase I: Building a Project Plan from Scratch
       1.1 Project Definition
       1.2 Planning activities
       1.3 Designating with software
Phase II: Assembling and programming in virtual Environment
       2.1 selection of the hardware components
       2.2 Establishing the connections between the components
       2.3 Developing the logic in C Lang
       2.4 Burning the code into the processor
Phase III: Demonstrating on the kit
       3.1 Optimizing the components
       3.2 detail understanding the hardware components on PCB
       3.3 Implementation of the Project

                                                      No. of hours: 40

Evaluation: Project Based

Phase I: 25%
Phase II: 25%
Phase III: 50%

Reference Books:

1. Machine Learning, 1st Edition by Pearson (English, Paperback, Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das) 2. Sebastian Raschka, "Python Machine Learning", PACKT publishing.
2. Artificial Intelligence by Saroj Kaushik, Cengage Learning
3. Wireless Sensor Networks Technology, , Protocols and Application by KAZEM SOHRABY, DANIEL MINOLI, TAIEB ZNATI, Wiley.
4. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives – Nina Godbole, Sunit Belapur, Wiley India Publications Released: April 2011.
5. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"

Reference Links :

1. http://www.robogalaxy.com/projects
2. https://robopediablog.wordpress.com/projects/

Kadi Sarva Vishwavidhyalaya, Gandhinagar
BCA – SEMESTER – VI
BCA : 606 Specialization (E-Commerce)
E – COMMERCE TECHNOLOGY - IV

Teaching and Evaluation Scheme:

The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of internal examinations which consists of Term Work such as class test, quizzes, class participation, home assignments, presentation, Regular Attendance Internal marks which consist 15 Term Work marks and External marks which consist of 35 for University examination.

Sub Code	Subject Title	Teaching Scheme		Exam Scheme				Total Marks
		Cr.	Hrs/ Week	Theory		Practical		
				Internal	External	Internal	External	
BCA 606	E – COMMERCE TECHNOLOGY-IV	2	2	-	-	15	35	50

Project: Develop E- Commerce based Project using PHP (Word Press, Magento), ASP.Net, and Java.

Project phase – II:

- **Data based design**
  - **Table design**
  - **Normalisation**
  - **Constrain**
    - **Primary key, foreign key etc.**
- **Screen layout**
  - **Template**
  - **Menu**
  - **Form**
  - **Report**
- **Coding**
  - **Validation**
- **Testing**
- **Implementation**

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