GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM
COURSE TITLE: ADVANCE JAVA PROGRAMMING
(COURSE CODE: 3360701)

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering/ Information Technology	Sixth

1. RATIONALE

This course provides the knowledge necessary to understand java and develop dynamic web pages using java server page (JSP). It covers the basic underlying concepts and techniques recently used in the IT industry. After going through this course student will be able to do Web Development and Desktop Application Development.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competency:

- **Develop Graphical User Interface applications in JAVA, Servlet and JSP"**

3. COURSE OUTCOMES (Cos)

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.
   i.   Develop Java Applet Programming using various techniques
  ii.   Develop applications using Abstract Window Toolkit
 iii.   Update and retrieve the data from the databases using JDBC-ODBC.
  iv.   Develop server side programs using Servlets.
   v.   Develop Java Server Pages applications using JSP Tags.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	200
3	0	4	7	70	30	40	60	

Legends: L - Lecture; **T -** Tutorial/Teacher Guided Student Activity; **P -** Practical;
C - Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

5. COURSE CONTENT DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit - I **Java Applets**	1a. Explain concept of applet life cycle 1b. Differentiate applet and application	1.1 Applet Programming : local and remote applets, difference between applet and application, applet life cycle, developing executable applet code
	1c. Develop code for simple Java applets 1d. Explain applet tag and its parameter 1e. Use the methods of the applet and component classes required for a basic applet	1.2 Web Page Design : applet tag, adding applet to HTML file, running the applet, passing parameter to applet, various methods and component classes to develop basic applet
Unit -II **Abstract Window Toolkit (AWT)**	2a. Describe the classes in the AWT package that relate to the applet class	2.1 Abstract Window Toolkit(AWT): classes hierarchy, windows fundamentals 2.2 Frame Windows : creating a frame window in applet, canvas, creating windows program
	2b. Describe the AWT graphics explain controls and how to apply them in the container	2.3 Graphics-AWT Controls: Labels, TextField, Push buttons 2.4 Layout Managers (Flow Layout, Border Layout, Grid Layout, Card Layout) 2.5 Developing Graphical User Interface using Swing: JApplet,JLabel,JTextField, JButton,JCheckBox, JRadioButton, JComboBox, Menus
	2c. Develop simple programs using event class and event listener interface	2.6 Event Classes: MouseEvent Class , ActionEvent Class, WindowEvent Class 2.7 Event Listner Interface: MouseListener, ActionListener, WindowListener and KeyListner
Unit – III **Java Data Base Connectivity (JDBC)**	3a. Describe the basics of JDBC and its connectivity	3.1 Two-Tier Database Design, Three-Tier Database Design 3.2 The JDBC API: The API components, database operations like creating tables, CRUD(Create, Read, Update, Delete) operations using SQL
	3c.Explain different types of JDBC drivers and their advantages and disadvantages	3.3 JDBC- advantages and disadvantages 3.4 JDBC drivers

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
	3d. Develop program using JDBC to query a database and modify it	3.5 JDBC-ODBC bridge 3.6 Develop java program using JDBC
Unit IV **Servlets**	4a. Describe life cycle of servlet	4.1 The life cycle of a servlet 4.2 The Java Servlet Development Kit 4.3 The Simple Servlet: create and compile servlet source code, start a web browser and request the servlet, example of echo servlet and deployment in tomcat server
	4b. Develop program using javax.servlet package	4.5 The javax.servlet Package: reading database/table records and displaying them using servlet
Unit V **Java Server** **Pages (JSP)**	5a. Explain the architecture of JSP and its life cycle 5b. Develop simple programs using Java Server Pages tags	5.1 Relation of Applets and Servlets with JSP 5.2 JSP Scripting Elements 5.3 JSP Expressions 5.4 Difference between JSP and Servlet 5.5 JSP Declarations 5.6 Simple JSP program to fetch database records

6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
1.	Java Applets	09	4	4	4	12
2.	Abstract Window Toolkit (AWT)	12	6	8	7	21
3.	Java Data Base Connectivity (JDBC)	05	4	4	4	12
4.	Servlets	08	5	5	5	15
5.	Java Server Pages (JSP)	08	2	3	5	10
	Total	**42**	**21**	**24**	**25**	**70**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)
Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical should be properly designed and implemented with an attempt to develop different types of skills (**outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

*Note: Here only outcomes in psychomotor domain are listed as practical. However, if these practical are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.*
Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

Sr. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1	I	Develop an applet that draws a circle. The dimension of the applet should be 500 x 300 pixels. The circle should be centered in the applet and have a radius of 100 pixels. Display your name centered in a circle.(using drawOval() method)	2
2		Draw ten red circles in a vertical column in the center of the applet.	2
3		Built an applet that displays a horizontal rectangle in its center. Let the rectangle fill with color from left to right.	2
4		Develop an applet that display the position of the mouse at the upper left corner of the applet when it is dragged or moved. Draw a 10x10 pixel rectangle filed with black at the current mouse position.	2
5		Develop an applet that contains one button. Initialize the label on the button to "start", when the user presses the button, which changes the label between these two values each time the button is pressed.	2
6		Develop an applet that uses the mouse listener, which overrides only two methods which are mousePressed and mouseReleased.	2
7	II	Develop a program that has only one button in the frame, clicking on the button cycles through the colors: red->green->blue and so on. One color changes per click.(use getBackGround() method to get the current color)	4
8		Develop an program that contains three check boxes and 30 x 30 pixel canvas.The three checkboxes should be labeled "Red", "Green","Blue". The selection of the check boxes determine the color of the canvas. For example, if the user selects both "Red" and "Blue", the canvas should be purple.	2

9		Create an application that displays a frame with a menu bar. When a user selects any menu or menu item, display that selection on a text area in the center of the frame	2
10		Develop a program that draws two sets of ever-decreasing rectangles one in outline form and one filled alternately in black and white.	4
11	III	Develop a database application that uses any JDBC driver	4
12		Develop a Graphical User Interface that performs the following SQL operations: a) Insert b) Delete c)Update.	4
13		Develop a program to present a set of choice for user to select a product and display the price of product.	4
14	IV	Develop a simple servlet program which maintains a counter for the number of times it has been accessed since its loading, initialize the counter using deployment descriptor.	4
15		Create a web form which processes servlet and demonstrates use of cookies and sessions.	4
16	V	Develop a simple JSP program for user registration and then control will be transfer it into second page.	4
17		Develop a simple JSP program for user login form with static and dynamic database	4
18		Develop a JSP program to display the grade of a student by accepting the marks of five subjects.	4
		Total Hours	**56**

8. SUGGESTED LIST OF STUDENT ACTIVITIES
Following is the list of proposed student activities such as:
   i.   Understanding of advance JAVA programming.
   ii.   Demonstrate advance JAVA programming in real world.
   iii. Develop a program with real world application
   iv.   Develop mini projects
   v.   Solve real time industry problems through advance JAVA programming.

9.   SPECIAL INSTRUCTIONAL STRATEGIES (if any)
   i. Faculty should demonstrate the features of Advance Java for clear understanding of the students
   ii. Concepts should be introduced in classroom input sessions and by giving demonstration through projector.
   iii. More focus should be given on practical work which will be carried out in laboratory sessions. If possible some theory sessions may be conducted in labs so that theory and practice can go hand in hand.
   iv. Group Discussion and presentation of relevant websites
   v. Faculty should allow students to use their creativity and let them struggle to learn on their own during practical sessions. However, faculty should remain around the students and should help them when they are stuck.

10. SUGGESTED LEARNING RESOURCES
(A) List of Books*

Sr No.	Title of Book	Author	Publication
1	Complete Reference Java 2	Herbert Schildt	TMH
2	Core Java Volume-I Fundamentals	Cay S. Horstmann Gary Cornell	Pearson
2	Swing: A Beginner's Guide	Herbert Schildt	TMH
3	Java Programming Cook Book	Herbert Schildt	MGH
4	Unleashed Java 2 Platform	Jamie Jaworski	Sams Techmedia
5	Java Programming	Sachin Malhotra, Saurabh Choudhary	Oxford
6	Introduction to Java Programming	Y. Daniel Liang	Pearson
7	Web Technology with Advanced Java	Soumadip Ghosh	University Press
8	Java Enterprise Edition A Practical Approach	B. Mohamed Ibrahim	University Press
9	Java Swing	Obert Eckstein, Marc Loy, Dave Wood	O'Reilly Media
10	Java 2 Intermediate to Advanced User Guide for Technicians	Benjamin Aumaille	Firewall Media

*Preferably Latest editions

(B) List of Major Equipment/Materials

Hardware: Desktop Computer P-IV processor or higher
Software: jdk1.2 or higher version, BlueJ, NetBeans , Eclipse

(C) List of Software / Learning Websites

   i. **Java Applets**
      http://docs.oracle.com/javase/tutorial/deployment/applet/index.html
  ii. **Introduction to GUI Programming**
      http://math.hws.edu/javanotes/c6/index.html
 iii. **Creating a GUI using AWT**
      http://www.tutorialspoint.com/awt/
  iv. **Creating GUI using Java Swing**
      https://docs.oracle.com/javase/tutorial/uiswing/
   v. **JDBC Database Access**
      https://docs.oracle.com/javase/tutorial/jdbc/
  vi. **Servlet Technologies**
      http://www.oracle.com/technetwork/java/index-jsp-135475.html
 vii. **Java Server Pages**
      http://www.oracle.com/technetwork/java/javaee/jsp/index.html

viii. The Java EE 6 Tutorial
     https://docs.oracle.com/javaee/6/tutorial/doc/bnafd.html

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. P. P. Kotak**, H. O. D Computer Department, A. V. P. T. I., Rajkot
- **Prof. R. M. Shaikh**, H.O.D Computer Department, K. D. Polytechnic, Patan
- **Prof. K. N. Raval**, H.O.D Computer Department, R. C. Technical Institute, Ahmedabad
- **Prof. R. M. Shah**, Sr. Lecturer in Computer Technology, Government Polytechnic, Ahmedabad.
- **Prof .(Ms.) A. S. Galathiya**, Lecturer Computer, R C Technical Institute, Ahmedabad.
- **Prof. H. J. Prajapati**, Lecturer (IT), Government Polytechnic, Himatnagar.
- **Prof.A. J. Shah**, Lecturer IT, L.J Polytechnic, Ahmedabad.

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. Shailendra Singh,** Professor Head, Dept. of Computer Engineering and Applications
- **Dr M A Rizvi,** Associate Professor, Dept. of Computer Engineering and Applications