

**Gujarat University**  
**Choice Based Credit System (CBCS)**  
**B. Sc. Semester – VI (Computer Science)**  
**Syllabus for Computer Theory & Practical**  
**Academic Year 2013 -14**

**Gujarat University**

<b>Unit</b>	<b>Computer Theory</b>	<b>Computer Theory</b>	<b>ComputerTheory</b>	<b>Computer Theory</b>	<b>Computer Elective Subject</b>	<b>ComputerPractical</b>
	COM – 307  4 Credit  Total 100 Marks  Internal 30 Marks External 70 Marks  4 hrs/Week	COM – 308  4 Credit  Total 100 Marks  Internal 30 Marks External 70 Marks  4 hrs/Week	COM – 309  4 Credit  Total 100 Marks  Internal30Marks External70Mark  4 hrs/Week	COM – 310  4 Credit  Total 100 Marks  Internal 30 Marks External 70 Marks  4 hrs/Week	COM – 311  2 Credit  Total 100 Marks  Internal 30 Marks External 70 Marks 3 hrs/Week	COM – 312  5 Credit  Total 200 Marks  Group A : 100 Group B : 100  Internal 30 Marks External 70 Marks 12 hrs/Week
<b>I</b>	Introduction to Coding	Java Exception Handling	Overview of computer Graphics	Operating System Concepts	Student has to select one subject elective course from below,  System Software &  Introduction to Datawarehousing & Dataming	There are A,B Groups,
<b>II</b>	Software testing methods	Java Applet	Graphics primitive	Memory Management		A group Constist of 34 experiments,
<b>III</b>	Project management	Event Handling of AWT controls	Polygons	Process Management		B group Constist Project Training
<b>IV</b>	S/w quality & Risk Management	Java Swing & Concept of JDBC	Geoetric Transformation	Device Management		

**Choice Based Credit System (CBCS)**  
**Syllabus for B. Sc. Semester - VI (Computer Science)**  
**COM 307 : Software Engineering - II (Theory)**

**Hours: 4 /week**

**Credits: 4**

- 1 Introduction to Coding**
  - 1.1 Programming Practices**
    - 1.1.1 Structured programming practices**
    - 1.1.2 Event driven programming practices**
    - 1.1.3 Object oriented programming practices**
    - 1.1.4 Coding style**
  - 1.2 Code verification**
    - 1.2.1 Code reading & statics analysis**
    - 1.2.2 Code inspection & reviews**
    - 1.2.3 Unit testing**
- 2 Software testing methods**
  - 2.1 Software testing fundamentals**
    - 2.1.1 Testing objects**
    - 2.1.2 Testing Principals & guidelines**
    - 2.1.3 Testability**
    - 2.1.4 Error, Fault, Failure & Defect.**
    - 2.1.5 Test case**
  - 2.2 White box testing & techniques**
    - 2.2.1 Introduction to white box testing & benefits & limitations**
    - 2.2.2 Basis path testing**
    - 2.2.3 Control flow testing**
    - 2.2.4 Data flow based testing**
  - 2.3 Black box testing & techniques**
    - 2.3.1 Introduction to Black box testing & benefits & limitations**
    - 2.3.2 Equivalence Partitioning**
    - 2.3.3 Boundary Value Analysis**
- 3 Software Project Management**
  - 3.1 Introduction of project management activities**
  - 3.2 Size, Cost & Effort estimation**
    - 3.2.1 Single variable models based estimation-LOC & FP based estimation**
    - 3.2.2 COCOMO Models**
  - 3.3 Project team**
    - 3.3.1 Roles in software projects**
    - 3.3.2 Team Structures**

- 4 Software Quality Assurance & Risk management**
  - 4.1** Verification & validations
  - 4.2** Inspections, informal & formal reviews
  - 4.3** Risk management
    - 4.3.1** Risk management overview
    - 4.3.2** Risk management strategies
    - 4.3.3** Risk identification & assessment
    - 4.3.4** Risk mitigation ,monitoring & control

## **REFERENCE**

1. Software Engineering: A Practitioner's Approach, 4e/5e, Roger S. Pressmann, McGrawHill Publication
2. Integrated Approach to Software Engineering, Pankaj Jalote, Narosa Publication.
3. Software Testing , Ron Patton, SAMS-Techmedia Publication
4. Practical Project Management, Ivan Bayross, Firewall Media.
5. Microsoft Office Project 2003 Bible, Elanic Marmel, Wiley Publishing
6. Software Engineering, K. K. Aggrawal, Yogesh Singh, New Age International Publishers.
7. Fundamentals of Software Engineering, carlo Ghezzi, Mehdi Jazayeri, Dino Mendrilo, PHI.
8. Software Engineering, Ian Summerville, Addison Wesley-Pearson Education.
9. Software Engineering, K. L. James, PHI

**Gujarat University**  
**Choice Based Credit System (CBCS)**  
**Syllabus for B. Sc. Semester - VI (Computer Science)**  
**COM 308 : JAVA Programming - II (Theory)**

**Hours: 4 /week**

**Credits: 4**

**1. Java Exception Handling**

- 1.1.1 Categories of Errors
- 1.1.2 Concepts of Exception handlings
- 1.1.3 Types of exceptions
- 1.1.4 Uncaught exceptions
- 1.1.5 Nested Try clause
- 1.1.6 Throw clause
- 1.1.7 Finally Clause
- 1.1.8 User defined exceptions
- 1.1.9 Difference between Checked and Unchecked Exceptions
- 1.1.10 Throw and Throws

**2. Java Applet**

- 2.1 Life cycle of Applet
- 2.2 Applet Class
- 2.3 Invoking Applet
- 2.4 Passing parameters to Applet
- 2.5 AWT class
- 2.6 FONT and COLOR class
- 2.7 Applet Coordinates system
- 2.8 Frame and Panels
- 2.9 Displaying various shapes (Circle, line, polygons)
- 2.10 Displaying messages on statusbar

**3. Event Handling of AWT controls**

- 3.1 Concepts of Event Handling
- 3.2 Various components and Event Handlings of Components:
  - 3.2.1 Button Events
  - 3.2.2 Checkbox Events
  - 3.2.3 RadioButton , Checkbox Events
  - 3.2.4 List Events
  - 3.2.5 Scrollbar events
  - 3.2.6 TextField events
  - 3.2.7 TextArea events
  - 3.2.8 Mouse Events
  - 3.2.9 Keyboard Events

## **4. Java Swing and Concepts of JDBC**

- 4.1 Introduction to Swing
- 4.2 Swing class and its hierarchy
- 4.3 Swing components
  - 4.3.1 JFrame
  - 4.3.2 Jwindow
  - 4.3.3 Jlabel
  - 4.3.4 JtextField
  - 4.3.5 Jbutton
  - 4.3.6 JRadioButton
  - 4.3.7 JComboBox
  - 4.3.8 JMenuBar
  - 4.3.9 Layout Managers
- 4.4 Architecture of JDBC
- 4.5 JDBC API classes and Interfaces
- 4.6 Creating DSN for database
- 4.7 Connectivity with Java applet

### **List of Reference Books:**

- 1) The Complete Reference Java2, Herbert Schildt, TMH, New Delhi
- 2) Mastering JAVA2, John Zukowski, BPB
- 3) Teach Yourself Java2 platform in 21 days, Lamey & Cadenhead, Teach Media
- 4) Java in Nut shell, O'Relly Publication
- 5) Java Language Reference, O'Relly Publication

**Gujarat University, Ahmadabad**  
**Choice Based Credit System (CBCS)**  
**Syllabus for B.Sc. Semester – VI (Computer science)**  
**COM 309 : Computer Graphics**

**Hours : 4 / Weeks**

**Credit : 4**

**1. Overview of Computer Graphics**

- 1.1 Historical background of computer Graphics
- 1.2 Applications of Computer Graphics
- 1.3 Popular graphics software
- 1.4 Pixel graphics versus Vector Graphics
- 1.5 Hard copy graphics Devices

**2. Graphics primitive**

- 2.1 Line Drawing Algorithms
  - 2.1.1 Vecgen Algorithm
  - 2.1.2 Brasenham Line Drawing Algorithm
- 2.2 Circle generating algorithms
  - 2.2.1 Parametric circle drawing algorithm
  - 2.2.2 Brasenham circle algorithm
- 2.3 Different line styles
  - 2.3.1 Thick line
  - 2.3.2 Line caps
  - 2.3.3 Thick line joins
  - 2.3.4 Pens and Brushes
- 2.4 Curves
  - 2.4.1 DDA approach for drawing a circular arc
- 2.5 Text and Character Attributes
- 2.6 Anti Aliasing

**3. Polygons**

- 3.1 Polygon formation
- 3.2 Polygon inside tests
  - 3.2.1 Even – odd method
  - 3.2.2 Winding number method
  - 3.2.3 Some other method for performing inside test
- 3.3 Polygon area filling
  - 3.3.1 Flood fill method
  - 3.3.2 Scan line fill method
  - 3.3.3 Boundry fill

**4. Geometric Transformation**

- 4.1 Basic transformation
  - 4.1.1 Scalling, Translation, Rotation
- 4.2 Homogeneous Coordinates
- 4.3 Rotation relative to and Arbitrary point
- 4.4 Some other transformations: Reflexion, Shering
- 4.5 Coordinate Transformation
- 4.6 Inverse Transformation

4.7 Affine Transformation

4.8 Raster Transformation

## **5. Viewing in two dimensions**

5.1 Window and View port

5.2 Viewing Transformation

5.3 Clipping

5.3.1 Point Clipping

5.3.2 Line Clipping

5.3.3 Polygon Clipping

5.4 Sutherland – Hodgman Polygon clipping algorithm

5.5 Text Clipping

5.6 Multiple windowing

## **6. Color and Shading: Light Sources, Illumination, Shading, Transperancy, Shadow, Colors**

### **Reference Books:**

- 1) Computer Graphics, Donald Hearn, M Pauline Baker, PHI, New Delhi
- 2) Computer Graphics : Dr A A Desai, PHI
- 3) Computer Graphics, Herrington, PHI, New Delhi
- 4) Principle of Computer Graphics, Newman & Sproul, McGraw Hill
- 5) Interactive Computer Graphics, Giloi W K , PHI, New Delhi
- 6) Computer Graphics, R A Plastoce

**Gujarat University**  
**Choice Based Credit System (CBCS)**  
**Syllabus for B. Sc. Semester - VI (Computer Science)**  
**COM 310 : Operating System (Theory)**

**Hours: 4 /week**

**Credits: 4**

**1. Operating System Concepts**

- 1.1. Evolution of Operating System & History
- 1.2. Need of an Operating System
- 1.3. Single User & Multi User Operating System
- 1.4. Elements of an Operating System

**2. Memory Management**

- 1.1. Memory Management Functions
- 1.2. Contiguous Allocation And . Non-contiguous Allocation
  - 1.2.1. Partitioned Memory Static and Dynamic allocation
  - 1.2.2. Segmentation
  - 1.2.3. Paging Segmentation
  - 1.2.4 Demand Paging and Segmentation

**3. Process Management**

- 3.1. Process Management
- 3.2. Process Concept
- 3.3. Scheduling
- 3.4. Scheduling Algorithms
- 3.5. Process co-ordination
  - 3.5.1. Producer / consumer Problem
  - 3.5.2. Critical Section Problem
  - 3.5.3. Semaphores
  - 3.5.4. Inter Process Communication
  - 3.5.5. Deadlocks

**4. Device Management**

- 4.1. Device Management Function
- 4.2. Device Characteristics
- 4.3. Disk space Management
- 4.4. Allocation and Disk Scheduling Methods



### **Reference Books:**

1. Operating System Concepts – James Peterson – McGraw Hill
2. Silberschatz - An OS Concept – Addition Wesley Publication
3. W. Stallings – An Operating Systems – Pearson Education
4. I.M.Flinn, A.M. Mchoes – Understanding Operating Systems – Thomson Learning
5. Donovan M. – Operating Systems - McGrew Hill Pub.
6. Crowley : Operating Systems : A design Oriented Approach – Tata McGraw Hill
7. S. Godbole – Operating Systems TMH.
8. Tanenbaum & Woodhull – Operating Systems : Design and Implementation, 3rd Edition.

**Gujarat University**  
**Choice Based Credit System (CBCS)**  
**Syllabus for B. Sc. Semester - VI (Computer Science)**  
**COM 312 : Practical (Based on JAVA Programming – II & Computer Graphics**  
**& Project Training)**

**Hours: 12 /week**

**Credits: 5**

<b>Total Practical Marks</b>	<b>200</b>
<b>Java - II &amp; CG</b>	<b>100</b>
<b>Project Training</b>	<b>100</b>

**JAVA Practicals List**

1. Write a Java Program to create a String object. Initialize this object with your name. Find the length of your name using the appropriate String method. Find whether the character 'a' is in your name or not; if yes find the number of times 'a' appears in your name. Print locations of occurrences of 'a'.
2. Write a Java Program for String handling which performs the following :
  - a) Checks the capacity of StringBuffer objects.
  - b) Reverses the contents of a string given on console and converts the resultant string in upper case.
  - c) Reads a string from console and appends it to the resultant string of ii.
3. Write a program for searching for the first occurrence of a character or substring and for the last occurrence of a character or substring.
4. Write a Java Program to read a statement from console, convert it into upper case and again print on console.
5. Write a Java Program which will read a string and rewrite it in the alphabetical order e.g. the word "STRING" should be written a "GINRST".
6. Write a Java Program which will read a text and count all occurrences of a particular word.
7. Make an Applet that create two buttons named "Red" and "Blue" when a button is pressed the background color of the applets is set to the color named by the button's label.
8. Create an applet with three text Fields and two buttons add and subtract. User will enter two values in the Text Fields. When the button add is pressed, the addition of the two values should be displayed in the third Text Fields. Same the Subtract button should perform the subtraction operation.
9. Write a Java Applet that creates some text fields and text areas to demonstrate features of each.

10. Create user entry form for student data. User will enter roll no, name, dept and semester. Use combo box for dept. When user clicks on the Insert button all the values should be inserted in the Text Area in a row format for each record.
11. Write a java Applet program which reads your name and address in different text fields and when a button named find is pressed the sum of the length of characters in name and address is displayed in another text field. Use appropriate colors, layout to make your applet look good.
12. Create an applet which displays a rectangle/string with specified colour & coordinate passed as parameter from the HTML file.
13. Develop suitable GUI for the program using proper AWT controls and Layout Manager.
14. Write a Java Applet program, which provides a text area with horizontal and vertical scrollbars. Type some lines of text in the text area and use scrollbars for movements in the text area. Read a word in a text field and find whether the word is in the content of the text area or not.
15. Develop a Program to create a Text Field, a List Box and two buttons add and delete. User will enter values in the Text Field. When user clicks on the add button the value should be added in the List Box. When user clicks on the delete button, the selected item from the list should be removed.
16. Create a Text Field, a button and a list box, User has to enter a number in the Text Field. When user clicks on the button, the arithmetic table for that number should be displayed in the list box. If the user repeats this process the list box should be cleared and refilled by the latest values.
17. Write a Program to create a List Box and a Text Area. Fill up the List Box with some file names. When user double clicks on any filename of the list box, the file should be opened and its contents should be displayed in the text Area.
18. Create an applet to display the scrolling text. The text should move from right to left. When it reaches to start of the applet border, it should stop moving and restart from the left. When the applet is deactivated, it should stop moving. It should restart moving from the previous location when again activated.
19. Write a program to create three scrollbar and a label. The background color of the label should be changed according to the values of the scrollbars. (The combination of the values RGB)
20. Develop a program to write the text "Hello, how are you" to a file "Hello.txt". Also develop a program to read this file and to display the contents of this file using suitable GUI.
21. Develop an application/applet with a Menu File and two menu items color and font. The submenu of the menu item color will contain different colors which when selected should change the background of the applet. The submenu of the menu item font should contain the list of fonts. Create a Text Field in the center of the container. When the font is selected from the font list of menu, the Text Field text should be appeared in that font.
22. Create an applet to display the co-ordinates of the mouse pointer. The co-ordinates should be changed as and when the mouse pointer change its location.
23. Write a Java Program to show the features of Swing Component.

24. Write a Java Program to perform JDBC Operation like insert, Update, Delete and View the employee's records.

### **Computer Graphics Practical List :-**

1. Write a graphics program to print a point on the middle of the screen.
2. Write a graphics program to draw line using DDA LINE Algorithm.
3. Write a graphics program to draw line using BRESENHAM LINE Algorithm.
4. Write a graphics program to draw circle using MID Point circle Algorithm.
5. Write a graphics program to draw circle using equation of circle.
6. Write a graphics program to draw a various type of lines(thick , Dotred , Dashed).
7. Write a graphics program to generate Character using Bitmap method.
8. Write a graphics program to draw polygon using different Algorithm(scan line / seed fill).
9. Write a graphics program to perform two dimensional transformations.
  - 1) Translation
  - 2) Rotation
  - 3) Scaling
10. Write a graphics program for cohen - sutherland Line Clipping algorithm.

### **B. Sc. Semester - VI (Computer Science)**

#### **COM 313 : Practical (Project Training)**

College authority/concern department will assign a project guide and student has to work under allocated project supervisor for the project. Student has to submit the project report and give a project presentation and project viva-voce. Project supervisor has to take care such that the subject of the project falls under the category of Computer.

**STUDENTS ARE SUPPOSED TO SELECT ONE  
PAPER FROM THE GENERUIC ELECTIVE  
SUBJECTS**

**Gujarat University**  
**Choice Based Credit System (CBCS)**  
**Syllabus for B. Sc. Semester - VI (Computer Science)**  
**COM 311 : GENERIC ELECTIVE - II**

**Hours: 2 /week**

**Credits: 2**

**Subject: System Software**

- 1 Introduction to system software**
  - 1.1 System Software & its characteristics
  - 1.2 Overview of System Software Categories
  
- 2. Language Processor**
  - 2.1 Introduction to Language Processing
  - 2.2 Language Processing Activities
    - 2.2.1 Program Generation
    - 2.2.2 Program Execution-Translation & Interpretation
  - 2.3 Passes and Phases of Language Processor
    - 2.3.1 Intermediate Representation of Program
    - 2.3.2 Lexical Analysis-scanning
    - 2.3.3 Syntax Analysis-parsing
    - 2.3.4 Semantic analysis
  - 2.4 Language Processor Development Tools
    - 2.5.1 LEX
    - 2.5.2 YACC
  
- 3 Assemblers**
  - 3.1 Instruction formats, Addressing Modes and program Relocation
  - 3.2 Literals, symbols, expressions, program blocks, control section and program linking
  
- 4 Macros and Macro processors**
  - 4.1 Macro Definition and call
  - 4.2 Macro Expansion
  - 4.3 Nested Macro calls
  
- 5 Compilers and Interpreters**
  - 5.1 Introduction to datatypes, data structures, scope rules and control structures

- 5.2 Basic Compiler Functions-Grammars, Lexical Analysis, Syntactic Analysis and Code Generation
- 5.2 Introduction to memory allocation

## **6 Loaders & Linkers**

- 6.1 Basic Loader Functions
- 6.2 Relocation and Linking Concepts

### **Reference Books:**

- 1) System Programming and Operating Systems, D M Dhamdhere, Tata McGrawhill Publication
- 2) System Software- An introduction to Systems Programming, Leland L. Beck & D Manjula, Pearson Education
- 3) System Software- An introduction to Systems Programming, Leland L. Beck, Addison Wesley
- 4) Compiler Design, Chattopadhyay Santanu, PHI
- 5) Engineering a compiler, Cooper Keith, Elsevier(Academic Press)
- 6) Compiler Construction: Principles and Practices, Louder Kenneth C, Cengage Learning

**Gujarat University**  
**Choice Based Credit System (CBCS)**  
**Syllabus for B. Sc. Semester - VI (Computer Science)**  
**COM 318 : GENERIC ELECTIVE - II**

**Hours: 2 /week**

**Credits: 2**

**Subject: Introduction of Datawarehousing & Datamining**

**UNIT I: INTRODUCTION AND DATA WAREHOUSING**

Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining

**UNIT II: DATA PREPROCESSING, LANGUAGE, ARCHITECTURES, CONCEPT DESCRIPTION**

Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations.

**UNIT III: ASSOCIATION RULES**

Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases

**UNIT IV: CLASSIFICATION AND CLUSTERING**

Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorisation of methods, Partitioning methods.



## **REFERENCES**

1. J. Han, M. Kamber, "Data Mining: Concepts and Techniques", Harcourt India / Morgan Kauffman, 2001.
1. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education 2004.
2. Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education 2003.
3. David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2004.
4. W.H. Inmon, "Building the Data Warehouse", 3rd Edition, Wiley, 2003.
5. Alex Besson, Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", McGraw-Hill Edition, 2001.
6. Paulraj Ponniah, "Data Warehousing Fundamentals", Wiley-Interscience Publication, 2003.