



**SHREE H. N. SHUKLA COLLEGE OF I.T. & MGT.  
(AFFILIATED TO SAURASHTRA UNIVERSITY)**

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### SYLLABUS BCA – SEM-IV

B.C.A. (Semester – IV)			
SR.NO	SUBJECT	NO. OF THEORY LECT. PER WEEK	NO. OF PRACTICAL PER WEEK
1	<b>CS – 19</b> Graphics using C	4+1	6
2	<b>CS – 20</b> Programming with JAVA	4+1	6
3	<b>CS – 21</b> RDBMS Using Oracle	4+1	6
4	<b>CS –22</b> Operating Systems Concepts With Unix / Linux	4+1	3
5	<b>CS – 23</b> Practical (Based On CS- 19, CS-20)	-	-
6	<b>CS – 24</b> Practical (Based On CS- 21, CS-22)	-	-

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**SYLLABUS BCA – SEM-IV**

<b>CS - 19 : Computer Graphics Using 'C'</b>				
No.	Topic	Details	Marks	Approx. Lect.
1	Graphics Library	<ul style="list-style-type: none"><li>• Text mode &amp; Graphics mode</li><li>• Resolution</li><li>• 2D Co-ordinate system ( Rectangle &amp; Polar)</li><li>• Use of various graphics library functions (arc, bar, bar3d, circle, cleardevice, clearviewport, closegraph, detectgraph, drawpoly, ellipse, fillellipse, fillpoly, floodfill, getbkcolor, getcolor, getimage, getmaxcolor, getmaxx, getmaxy, getpixel, getx, gety, graphdefaults, grapherrormsg, graphresult, imagesize, initgraph, line, linerel, lineto, moverel, moveto, outtext, outtextxy, pieslice, putimage, putpixel, rectangle, restorecrtmode, sector, setbkcolor, setcolor, setfillpattern, setfillstyle, setgraphmode, setlinestyle, settextjustify, settextstyle, setviewport, textheight, textwidth)</li><li>• Programming exercises based on above functions</li></ul>	30	18
2	Drawing Basic Shapes	<ul style="list-style-type: none"><li>• Algorithm &amp; Program for the followings<ul style="list-style-type: none"><li>✓ DDA line drawing</li><li>✓ Line drawing using it's parametric representation</li><li>✓ Bransenham line drawing</li><li>✓ Bransenham circle drawing</li><li>✓ Bransenham ellipse drawing</li><li>✓ Circular arc drawing</li><li>✓ Rectangle drawing</li></ul></li></ul>	15	10



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		<ul style="list-style-type: none"> <li>✓ Cubic curve drawing ( B-spline and Bezier )</li> </ul>		
3	2D geometric transformations	<ul style="list-style-type: none"> <li>• Overview of transformation</li> <li>• Various basic transformations               <ul style="list-style-type: none"> <li>✓ Translation, Scaling, Rotation( w.r.t. origin &amp; w.r.t. any arbitrary point), Reflection( w.r.t. x-axis, y-axis, line <math>y=x</math>, line <math>y=-x</math>, origin), Shearing( x-shear and y-shear)</li> <li>✓ Representation of transformation using matrix</li> </ul> </li> <li>• Homogeneous Co-ordinate system               <ul style="list-style-type: none"> <li>✓ Concept &amp; need</li> <li>✓ Representation of various basic transformation matrices using homogeneous co-ordinate system</li> </ul> </li> <li>• Composite transformation               <ul style="list-style-type: none"> <li>✓ Exercises to obtain 3X3 composite transformation matrix for a given specific set of transformation sequence.</li> </ul> </li> <li>• Define UDF for each of the above transformation</li> <li>• Programming exercises to apply transformations (translation, scaling, rotation only) to a basic shape ( line, rectangle, triangle, circle only)</li> </ul>	15	10
4	Clipping & Filling	<ul style="list-style-type: none"> <li>• Concept of windowport and viewport</li> <li>• Overview of clipping</li> <li>• Sutherland Cohen line clipping algorithm &amp; its program</li> <li>• Overview of filling</li> <li>• Stack based seed filling algorithm &amp; its program               <ul style="list-style-type: none"> <li>✓ Floodfill procedure</li> <li>✓ Boundaryfill procedure</li> </ul> </li> </ul>	10	06
5	Drawing Chart	<ul style="list-style-type: none"> <li>• Overview of chart</li> <li>• Types of charts( line chart, bar chart,</li> </ul>	07	04



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		<ul style="list-style-type: none"> <li>pie chart )</li> <li>Programming exercise to draw a chart(line, bar, pie) for specific set of data points. (Note : No. of data points should be entered from keyboard)</li> </ul>		
6	Fractals	<ul style="list-style-type: none"> <li>Overview of fractal</li> <li>Topological dimension &amp; fractal dimension</li> <li>Classification of fractals (self similar, self affine, invariant(self squaring &amp; self inverse) )</li> <li>Geometric construction of self similar fractals</li> <li>Programming exercise to draw self similar fractals</li> <li>Concept of self squaring fractals</li> <li>Concept of self inverse fractals</li> </ul>	08	05
7	Drawing with mouse	<ul style="list-style-type: none"> <li>Int86() function with interrupt 33h &amp; its various services</li> <li>UDF for the followings               <ul style="list-style-type: none"> <li>✓ To initialize mouse</li> <li>✓ To show mouse pointer</li> <li>✓ To hide mouse pointer</li> <li>✓ To get mouse position &amp; button status</li> <li>✓ To restrict mouse pointer</li> </ul> </li> <li>Programming exercise for the following               <ul style="list-style-type: none"> <li>✓ Freehand drawing using mouse</li> <li>✓ Line drawing using mouse</li> <li>✓ Rectangle drawing using mouse</li> <li>✓ Circle drawing using mouse</li> <li>✓ Designing &amp; working with menus using mouse</li> </ul> </li> </ul>	15	07
<b>TOTAL</b>			100	60

Student Seminar : 05 Lectures



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Expert Talk : 05 Lectures  
Student Test : 05 Lectures  
Total : 75 Lectures

**Reference Books :**

- Graphics under 'C' by Yashwant Kanetkar (BPB)
- Computer Graphics & Multimedia by D.P. Mukherji (PHI)
- Computer Graphics by Donald Hearn, M. Pauline baker (PHI)
- Mastering Turbo 'C' (BPB)

<b>CS – 20 Programming with JAVA</b>				
No	Topic	Details	Marks	Lect.
1	Basics	Java Features, JDK and its components (Various tools of JDK), Bytecode and JVM Language building blocks (Tokens, identifiers, keywords, literals, white spaces, comments) Primitive data types and their initial values, arrays, operators – precedence and associativity ,type conversion and casting, garbage collection Loop statements – while,do,for,break,continue decision statements – if – else, switch	10	8
2	Class Fundas	Defining classes, creating objects, constructors, overloading and overriding of methods, static members, final variable and methods, abstract methods and class, finalize methods, inheritance using class, inheritance using interface, Nested classes access specifiers : public, protected, private, default modifiers : final, abstract, static, synchronized, native, volatile, transient	15	11



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3	Packages	Java API packages ( java.applet, java.awt, java.awt.event, java.io, java.lang, java.net, java.util, javax.swing etc.) which package is used for what purpose naming conventions, creating ,accessing and using packages, adding class to pacakage java.lang package classes (Object,Math,String,StringBuffer,Wrapper classes) java.util package classes (Date, Random, Calendar, GregorianCalendar, Vector, enumeration interface, Stack, Hashtable, StreamTokenizer)	10	8
4	Multithreading and Exception handling	Multithreading Thread, Java Thread Model, Implementing threads in two ways - Thread class and Runnable interface, various thread methods, thread states – (running, ready,dead, waiting states – waiting, sleeping, suspended, blocked), thread priorities, Synchronization and monitors – how to implement, deadlock in thread  Exception Handling Exception,Types of exception, exception handling using try,catch, finally, throw, throws etc.	15	10
5	Event Handling	Event Delegation Model or Event Class Hierarchy, All classes and interfaces of Event Delegation Model, Programmes related to event handling covering all types of events.	10	5
6	Applets	Applet class, Applet Life cycle, AppletContext class, Applet tag, passing parameters to applet, Use of java.awt.Graphics class and its various methods in an Applet	10	3



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7	Input / Output	Concept of streams, Difference between CharacterStreams and ByteStreams  CharacterStreams Reader, Writer, FileReader, FileWriter, BufferedReader, BufferedWriter, PrintWriter  ByteStreams InputStream, OutputStream, FileInputStream, FileOutputStream, FilterInputStream, BufferedInputStream, BufferedOutputStream, DataInputStream, DataOutputStream, ObjectInputStream, ObjectOutputStream PrintStream  Other Classes RandomAccessFile, StreamTokenizer, File	15	5
8	Swing	Layout managers FlowLayout, BorderLayout, CardLayout, BoxLayout GridBagLayout, GridLayout, GroupLayout, SpringLayout  GUI with Swing What is swing, Swing Vs AWT, Container class, JApplet, JLabel, JButton, JCheckBox, JCheckboxgroup, JChoice, JtextField, JtextArea, JList, JScrollbar, JPanel, JFrame, JMenu, JMenuBar, JMenuItem, JPasswordField, JRadioButton	15	10
<b>TOTAL :</b>			<b>100</b>	<b>60</b>

Students seminar - 5 Lectures.  
Expert Talk - 5 Lectures  
Students Test - 5 Lectures.

**Reference Books:**

1. Complete JAVA2 Certification
2. JAVA2 Black Book
3. A Programmer Guide to JAVA Certification By Khalid A. Mughal



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<b>CS – 21 : RDBMS Using Oracle</b>				
<b>No.</b>	<b>Topics</b>	<b>Details</b>	<b>Marks</b>	<b>Min Lect.</b>
1	SQL, SQL*Plus	<ul style="list-style-type: none"> <li>◆ Introduction to SQL</li> <li>◆ SQL Commands and Datatypes</li> <li>◆ Introduction to SQL*Plus</li> <li>◆ SQL*Plus formatting commands</li> <li>◆ Operator and Expression</li> <li>◆ SQL v/s SQL*Plus</li> </ul>	5	3
2	Managing Tables and Data	<ul style="list-style-type: none"> <li>◆ Creating and Altering tables (Including constraints)</li> <li>◆ Data Manipulation Command like Insert, update, delete</li> <li>◆ SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL, BETWEEN, EXISTS, LIKE</li> <li>◆ Join, subquery, Built in functions</li> </ul>	15	10
3	Other ORACLE database objects	<ul style="list-style-type: none"> <li>◆ View</li> <li>◆ Sequence</li> <li>◆ Synonyms, Database Links</li> <li>◆ Index</li> <li>◆ Cluster , Snapshot</li> </ul>	8	5
4	Data Control and Transaction Control Command	<ul style="list-style-type: none"> <li>◆ Grant,Revoke,Role,Creating Users</li> <li>◆ What is transaction?</li> <li>◆ Starting and Ending of Transaction</li> <li>◆ Commit, Rollback, Savepoint</li> </ul>	5	4
5	Introduction to PL/SQL	<ul style="list-style-type: none"> <li>◆ SQL v/s PL/SQL</li> <li>◆ PL/SQL Block Structure</li> <li>◆ Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.)</li> <li>◆ %TYPE and %ROWTYPE</li> <li>◆ Using Cursor(Implicit, Explicit)</li> </ul>	12	8
6	Advanced PL/SQL	<ul style="list-style-type: none"> <li>◆ Creating and Using Procedure, Functions, Package, Triggers</li> <li>◆ Creating Objects,</li> </ul>	20	12



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		<ul style="list-style-type: none"> <li>◆ Object in Database-Table</li> <li>◆ PL/SQL Tables, Nested Tables, Varrays</li> </ul>		
7	Oracle Database Structure	<ul style="list-style-type: none"> <li>◆ Instance Architecture               <ol style="list-style-type: none"> <li>1. Database Processes</li> <li>2. Memory Structure.</li> <li>3. Data files</li> </ol> </li> <li>◆ Creating &amp; Altering Database</li> <li>◆ Opening &amp; shutdown Database</li> <li>◆ Initialization Parameter</li> <li>◆ Control Files, Redo Logs files</li> <li>◆ Tablespace(Create, Alter, Drop)</li> <li>◆ Rollback Segment ( Create, Alter ) ( System &amp; Transaction RBS )</li> <li>◆ Oracle Blocks</li> <li>◆ Import</li> <li>◆ Export</li> <li>◆ SQL*Loader</li> </ul>	25	14
8	Backup & Recovery	<ul style="list-style-type: none"> <li>◆ Backup &amp; Recovery</li> <li>◆ Types of Backups               <ul style="list-style-type: none"> <li>◆ Control File Backups</li> <li>◆ Redo Log File Backups</li> <li>◆ Cold Backups</li> <li>◆ Hot Backups</li> </ul> </li> <li>◆ Net 8               <ul style="list-style-type: none"> <li>◆ What is Net 8 ?</li> <li>◆ Why use Net 8 ?</li> <li>◆ Net 8 Features</li> <li>◆ Listener</li> <li>◆ Dispatcher</li> </ul> </li> </ul>	10	4
<b>TOTAL</b>			<b>100</b>	<b>60</b>

Students seminar - 5 Lectures.  
Expert Talk - 5 Lectures  
Students Test - 5 Lectures.

**Reference Books:**

1. SQL,PL/SQL The programming - Lang.Of Oracle Ivan Bayross - BPB
2. Using Oracle 8i - Page, Hughes - QUE & PHI Publications
3. Oracle 8i The Complete Reference - George Koch, Kevin Loney - Oracle Press and Tata MacGraw-Hill



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**SYLLABUS BCA – SEM-IV**

<b>CS – 22 : Operating Systems Concepts With Unix / Linux</b>				
<b>No</b>	<b>Topics</b>	<b>Details</b>	<b>Mark s</b>	<b>App · Lect</b>
1.	Introduction	<ul style="list-style-type: none"><li>◆ Meaning of OS</li><li>◆ Functions of OS</li><li>◆ Evolution of an OS<ul style="list-style-type: none"><li>◆ Batch OS</li><li>◆ Multiprogramming OS</li><li>◆ Time Sharing OS</li><li>◆ Real time OS</li></ul></li></ul>	<b>10</b>	<b>5</b>
2.	Process	<ul style="list-style-type: none"><li>◆ Introduction of OS process</li><li>◆ Process State Transition Diagram</li><li>◆ Process Scheduling<ul style="list-style-type: none"><li>◆ FCFS</li><li>◆ SJN</li><li>◆ Round Robin</li><li>◆ Priority Base Non Preemptive</li><li>◆ Priority Base Preemptive</li></ul></li><li>◆ Difference between Multi processing, Multi tasking and Multi threading OS</li></ul>	<b>10</b>	<b>6</b>
3.	Memory Management	<ul style="list-style-type: none"><li>◆ Physical Memory and Virtual Memory</li><li>◆ Memory Allocation<ul style="list-style-type: none"><li>◆ Contiguous Memory Allocation</li><li>◆ Noncontiguous Memory Allocation</li></ul></li><li>◆ Virtual Memory Using Paging</li><li>◆ Virtual Memory Using Segmentation</li></ul>	<b>10</b>	<b>5</b>
4.	Starting With Unix	<ul style="list-style-type: none"><li>◆ Unix Architecture</li><li>◆ Unix Features</li><li>◆ Types Of Shell ( C, Bourn, Korn )</li><li>◆ Login Commands passwd, logout, who, who am i, clear</li></ul>	<b>5</b>	<b>2</b>



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5.	Unix File System And Related Commands	<ul style="list-style-type: none"> <li>◆ Unix File System Overview</li> <li>◆ Types Of Files               <ul style="list-style-type: none"> <li>◆ Ordinary Files</li> <li>◆ Directory Files</li> <li>◆ Device Files</li> </ul> </li> <li>◆ Unix File &amp; Directory Permissions</li> <li>◆ Related Commands ls, cat, cd, pwd, mv, cp, ln, rm, rmdir, mkdir, umask, chmod, chown, chgrp, find,pg,more,less,head,tail,wc,touch</li> </ul>	<b>10</b>	<b>4</b>
6.	Text Editing With vi Editor	<ul style="list-style-type: none"> <li>◆ Introduction of vi editor</li> <li>◆ Modes in vi</li> <li>◆ Switching mode in vi</li> <li>◆ Cursor movement</li> <li>◆ Screen control commands</li> <li>◆ Entering text, cut, copy, paste in vi editor</li> </ul>	<b>5</b>	<b>2</b>
7.	IO Redirection And Piping	<ul style="list-style-type: none"> <li>◆ Concept Of Redirection</li> <li>◆ Concept Of Piping</li> <li>◆ Operators in Redirection &amp; Piping               <ul style="list-style-type: none"> <li>◆ &lt;</li> <li>◆ &gt;</li> <li>◆ &lt;&lt;</li> <li>◆ &gt;&gt;</li> <li>◆  </li> </ul> </li> <li>◆ Examples for Redirection &amp; Piping</li> </ul>	<b>5</b>	<b>3</b>
8.	Advance Tools In Unix	<ul style="list-style-type: none"> <li>◆ Finding Patterns in Files grep,fgrep,egrep</li> <li>◆ Working with columns and fields cut,paste,join</li> <li>◆ Tools for sorting sort,uniq</li> <li>◆ Comparing files cmp,comm.,diff</li> <li>◆ Changing Information in Files tr,sed,</li> </ul>	<b>20</b>	<b>13</b>



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		<ul style="list-style-type: none"> <li>◆Examining File Contents od</li> <li>◆Tools for mathematical calculations bc,factor</li> <li>◆Monitoring Input and Output tee,script</li> <li>◆Tools For Displaying Date and Time cal,date</li> <li>◆Communications telnet,wall,mtod,write,mail,news, finger</li> <li>◆Process Related Commands : ps, command to run process in background, nice,kill,at,batch,cron, crontab,wait,sleep</li> <li>◆Concept of Mounting a File System mount command</li> <li>◆Concept of DeMounting a File System umount command</li> </ul>		
9.	Shell Programmin g	<ul style="list-style-type: none"> <li>◆Shell Keywords</li> <li>◆Shell Variables               <ul style="list-style-type: none"> <li>◆ System variables PS2, PATH, HOME, LOGNAME, MAIL, IFS, SHELL, TERM, MAILCHECK</li> <li>◆ User variables set, unset and echo command with shell variables</li> </ul> </li> <li>◆Positional Parameters</li> <li>◆Interactive shell script using read and echo</li> <li>◆Decision Statements               <ul style="list-style-type: none"> <li>◆ if then fi</li> <li>◆ if then else fi</li> <li>◆ if then elif else fi</li> <li>◆ case esac</li> </ul> </li> </ul>	25	20



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	<ul style="list-style-type: none"><li>◆ test command</li><li>◆ Logical Operators</li><li>◆ Looping statements<ul style="list-style-type: none"><li>◆ for loop</li><li>◆ while loop</li><li>◆ until loop</li><li>◆ break, continue command</li></ul></li><li>◆ Arithmetic in Shell script using expr</li><li>◆ Various shell script examples.</li></ul>		
	<b>TOTAL</b>	<b>100</b>	<b>60</b>

Students seminar - 5 Lectures.  
Expert Talk - 5 Lectures  
Students Test - 5 Lectures.

**Reference Books**

4. Unix Shell Programming Y. Kanetkar BPB Publications
5. Unix concepts and applications Sumitabha Das

**Hands-On (Not to be asked in the examination)**

- ◆ Installation of Unix / Linux
- ◆ User and Group Creation
- ◆ Demo of Various Applications available in Unix / Linux like Star Office, Games and other productivity tools.
- ◆ Demo of GNOME, KDE Desktops in Linux.

<b>CS - 23 : Practical based on CS – 19 &amp; CS – 20</b>		
Sessions	Topics	Marks
I	◆ CS – 19	50
II	◆ CS – 20	50

**Note : Each session is of 3 hours for the purpose of practical examination.**



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### **SYLLABUS BCA – SEM-IV**

<b>CS - 24 : Practical Based on CS –21 &amp; CS – 22</b>		
<b>Sessions</b>	<b>Topics</b>	<b>Marks</b>
<b>I</b>	<b>♦ CS – 21</b>	<b>50</b>
<b>II</b>	<b>♦ CS – 22</b>	<b>50</b>

**Note : Each session is of 3 hours for the purpose of practical examination.**

*Shree H. N. Shukla College  
of Information Technology*