BCA 3RD SEMESTER(CBCS) SYLLABUS

Semester	CORE COURSE (14)	Ability Enhancement Compulsory Course (AECC) (2)	Skill Enhancement Course (SEC) (2)	Elective: Discipline Specific (DSE) (4)	Elective: Generic (GE) (4)
III	BCA-HC-3016 Software Engineering		SEC -1		Any course from the list GE-3
	BCA-HC-3026 Data Structure and Algorithms				
	BCA-HC-3036 Database Management System				

Paper Code: CIT-HC-1016: Means: CIT (Subject code), HC (Course type: Honours Core), 1(Semester),01(first paper of the semester), 6(credit).

Skill Enhancement Course (SEC)

SEC 1 (choose one)

(i) BCA-SE-3014: Web Technology
(ii) BCA-SE-3024: Programming with C#
(iii) BCA-SE-3034: Open Source Software

Generic Elective (GE)

GE 1 (choose any One)

(i) BCA-HG-1016: Computer Based Accounting and Financial Management
(ii) BCA-HG-1026: Office Automation

GE 1 (choose any One)

(i) BCA-HG-1016: Computer Based Accounting and Financial Management
(ii) BCA-HG-1026: Office Automation

BCA-HC-3016: SOFTWARE ENGINEERING

(Credit: 5+1=6)(L: 5, P: 0, T: 1)

Theory: 60 Lectures, Tutorial: 15 Lectures

UNIT 1: Introduction **(20 Lectures)**

Software Processes & Characteristics, Software life cycle Models: Waterfall, Prototype, Evolutionary and Spiral Models, Software Requirements analysis & specifications: Requirement engineering, requirement, elicitation techniques like FAST, QFD, requirements analysis using DFD, Data dictionaries, ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.

UNIT 2: Software Project Planning **(10 Lectures)** Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, RiskManagement.

UNIT 3: Software Design **(10 Lectures)**

Data design**,** Architectural design**,** Interface design, Function Oriented Design, Object Oriented Design, Cohesion & Coupling, Classification of Cohesiveness & Coupling, Software Metrics: different types of project matrics

UNIT 4: Software Testing and Maintenance **(20 Lectures)** Testing Process, Design of Test Cases, Types of Testing, Functional Testing, Structural Testing,Test Activities, Unit Testing, Integration Testing and System Testing, Debugging Activities, Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation, Software quality Assurance, CASE tools: Analysis tools, design tools, SQA tools, software testing tools.

REFERENCE BOOKS

1. Rajeev Mall “*Software Engineering*” PHI
2. Pressman Roger “ *Software Engineering A Practitioners Approach*” Tata McGraw Hill
3. James F. Peters, Witold Pedrycz “*Software Engineering An Engineering Approa*

BCA-HC-3026: DATA STRUCTURE AND ALGORITHMS

(4+2=6) (L: 4, P: 4, T: 0)

Theory: 60 Lectures, Practical: 60 Lectures

UNIT 1: Definition **(4 Lectures)**

Concept of Data Types, elementary structure, words and their interpretations, packed words,
Arrays: Types, memory representation, address translation functions for one & two dimensional arrays, different examples.

UNIT 2: Linked Structure **(8 Lectures)**

Singly and doubly linked list, circular and non circular, list manipulation with pointers, example involving insertion and deletion of elements and their comparative studies with implementations using array structure

UNIT 3: Stacks and Queues **(6 Lectures)**

Definitions, representation using array and linked list structure, application of stack and queues in simulation, postfix conversion and evolution of arithmetic expressions

UNIT 4: Binary Trees **(12 Lectures)**

Definition, quantitative properties, memory representation, Trees traversal algorithms (recursive and non-recursive), threaded trees, BFS, DFS

UNIT 5: Searching **(10 Lectures)**

Linear and binary search algorithms, performance and complexity, binary search trees (construction, insertion, deletion and search), Concept of optimal binary search trees

UNIT 6: Sorting **(12 Lectures)**

Terminology, sorting algorithms (non recursive, recursive description, Complexity, advantages and disadvantage, implementation), bubble sort, insertion sort, selection sort, tree sort, heap sort, quick sort, merge sort & radix sort, external Sorting.

UNIT 7: Analysis of Algorithm **(8 Lectures)**

Time and Space complexity of algorithms, average case and worst case analysis, asymptotic notation as a measure of algorithm complexity, O and θ notations, Analysis of sorting algorithms-Selection sort, Bubble sort, Insertion sort, Heap sort, Quick sort and analysis of searching algorithms – linear search and binary search.

Practical / Lab work to be performed

(Write programs in C language)

1. Implement binary search and linear search algorithms on arrays.
2. Implement following sorting algorithms:

i) Bubble sorting ii) Insertion sort iii) Heap sort iv) Quick sort v) Merge sort

3. Write a program to create a singly linked list and insert an element at the beginning, end, and at a given position of the linked list.

4. Write a program to create a singly linked list and delete an element from any position of the linked list.
5. Write a program to create a singly linked list. Write functions for
   i. counting the number of elements in a list
   ii. to search for a given element in a list. If the item has been found then it should return the position at which the item was found; otherwise it should return -1 to indicate not found.
6. Write a function to concatenate two linked lists.
7. Write a function to merge two sorted linked lists.
8. Write a program to create a doubly linked list and insert an element at any position.
9. Write a program to create a doubly linked list and delete an element from a given position.
10. Write a program to create a circular linked list and insert / delete an element at any position.
11. Write a program to implement a stack using
    i) array structure
    ii) linked list structure
12. Write a program to implement two stacks using a single array.
13. Write a program to evaluate a postfix expression using stack.
14. Write a program to convert an infix expression into a postfix expression.
15. Write a program to implement a queue using array.
16. Write a program to implement a queue using linked list.
17. Write a program to implement a circular queue using array.
18. Write a program to implement a circular queue using linked list.
19. Write a program to create a binary search tree using link representation and display the elements in preorder, in order and post order using recursive function.
20. Write a program to create a binary search tree using link representation and
    i) search
    ii) delete an item from the binary search tree.

REFERENCE BOOKS

1. Horowitz and Sahani, Narosa, *Data Structure*
2. A.N.Kamthane, *Introduction to Data Structures in C*, Pearson, 2007.
3. Langsam**,** Augentein & Tanenbaum, *Data Structure using C and C++*, PHI
4. S.K.Bandyopadhyay, K.N.Dey, *Data Structures using C,* Pearson

BCA-HC-3036: DATABASE MANAGEMENT SYSTEM

(Credit: 4+2=6)(L: 4, P: 4, T: 0)

Theory: 60 Lectures, Practical: 60 Lectures

NIT 1: File Structure **(12 Lectures)**

Record storage and primary file organization: memory hierarchies and storage devices, Storage of Databases, Placing file records on disks: Records and its Types, Files, Fixed length records and variable length records, Record Blocking, allocating file blocks on disks, operation on files, Issues in Physical Design: Concept of indexes

UNIT 2: Overview of Database Management System **(8 Lectures)**

Definition of Database, Traditional File Approach vs. DBMS approach, Characteristics of the Data Base Approach, DBMS user, Role of a DBA, Advantage of using DBMS, DBMS architecture, Data independence, ANSI/SPARC 3 level architecture.

UNIT 3: Relational Models **(20 Lectures)**

Fundamental integrity rules: entity integrity, referential integrity, Relational algebra (Select , Project, Cross ,Product , theta join, equi join, natural join, outer join), Set Operation, ANSI SQL – 92 Standard : DDL, DML, SQL constructs(Select .. From… Where… Group by ….. Having… Order by….), Insert, Delete, Update, View, Definition and use, nested quires, Constraints considers(NOT NULL , UNIQUE, Check Primary key, Foreign key)

UNIT 4: Database Design **(20 Lectures)**

Conceptual model, logical model, physical model, ER model as a tool for conceptual design-entities, attributes and relationships, weak and strong entities, conversion of ER model into relational schema. DFD, Normalization: informal design guidelines for relational schemas (overview level), functional dependencies, different types of keys, Normal forms (first, second, third, BCNF), Functional dependency diagram and design of relational database from it. Database connectivity using JDBC.

Practical / Lab work to be performed

Each student should do at least 6 assignments from the following list. They need to connect database using JDBC.

1. Create a table ***Employee*** with the following columns:

Emp_no (numeric) primary key
Emp_name (string)
Join_date (Date)
Basic_pay_fixed_at (numeric)
Date_of_birth (Date)

Insert the following data into the table.

Emp_no.	**Emp_name**	**Join_date**	**Basic_pay**	**Date_of_birth**
1001	Charles Babbage	01-Jun-2000	8000.00	03-10-1973
1002	George Boole	01-Jul-2001	5000.00	04-12-1972

1003	E.F. Codd	01-Jun-2001	8000.00	06-03-1969
1004	Bill Gates	01-Jul-2003	5000.00	09-10-1995
1005	Tony Greig	01-Aug-2004	8000.00	04-05-1985

2. Create the following two tables and insert data into the tables.

Player (Roll no.→Primary Key)

Roll no.	**Name**
10	Vijay Amrithraj
20	Leander Paes
30	Mahesh Bhupathi
40	Sania Mirza

Match (Match_no→Primary key,Roll no→Foreign key)

Match_no	Roll_no.	Match_Date	Opponent
1	20	10-Jul-2008	Washington
2	30	12-Jan-2008	Sampras
3	20	12-Aug-2008	Borg
4	30	20-Mar-2008	Vijay

Perform the following two operations:

(i) Perform EQUIJOIN operation to retrieve data from both the files.

(ii) Perform OUTERJOIN operation to retrieve the unmatched records.

3. Design an ER diagram for a ***BANK*** database schema. To consider that each Bank can have multiple branches and each branch can have multiple Accounts and Loans for customer. Also to specify the non weak & weak entity types, key attributes & key types, relationship types, instances, constraints and participations.

4. Create a table ***Student*** taking the attributes given bellow Roll_no, Student_name, Address, Date_of_addmission, Class Section and Contact_no. Write appropriate queries to perform the following operations:

a) To insert values in the Student table.

b) To delete values from Student table

c) To list the names of all students which roll_no > 20.

d) To search for students who got admitted before 01-01-2006.

e) To change the name of the student whose roll number is 10 to Amar.

5. Create tables ***Department*** and ***Employee*** with the attributes given below.

Employee (EmpNo , Empname, Address, Dno)

Department (Dno, Dname, Location)

Dno in Employee is a foreign key.

Write appropriate queries to perform the following operations:

a) To insert values in the tables.

b) To retrieve the names and addresses of all Employees working in the Finance department.

c) To print the location where Administration department is located.

d) To delete all information regarding a particular employee.

6. Create table ***Student*** and ***Course*** taking the attributes given bellow.

Student (Roll_no, Name, Semester,
Course_no(Foreign key))

Course (Course_no, Course_name)

Write appropriate queries for the following operations:

a) To retrieve names of all students who are admitted to the course „BCA‟.

b) To retrieve the names of all students whose course name is „BCA‟ and who are in the 3rd semester.

c) To display details of all courses in which more than 100 students got admitted.

d) For course being offered, display the course name and number of students admitted to the course.

7. Create tables ***Employee***, ***Department***, ***Location***, ***Works_on***, and ***Project*** taking the attributes given below.

Employee (Fname, Lname, Empno,
Bdate, Address, Salary, Dnumber)
Department (Dname,Dnumber,Mgrno)
Locations(Dnumber, DLocation)
Works_on(Empno, Pnumber, Hours_per_day)
Project(Pname, Pnumber, Location, Dnumber (Foreign))
Dependent(Empno, Dependent_name, Sex, DOB, Relationship)

Write appropriate queries for the following operations:

a) Retrieve the names and addresses of all employees who work in the Finance department.

b) To retrieve the names of all employees who works on all the projects controlled by department number 6

c) For each department, print the name of the department and the name of the manager of the department.

d) Retrieve the location where the Administration department is located.

e) For every project located in Mumbai list the project number, the controlling department and department manger’s name and address.

f) Find out how many employees are there in each department.

g) Find the total salary of all employees of the “Research” department, as well as the maximum, minimum and average salary in this department

h) Retrieve the name of all employees who have no dependent.

i) Alter the “Employee” table by deleting the coloumn Bdate.

j) Retrieve the Fname, Lname of all employees whose salary is higher than average salary.

k) For each department retrieve the department number, the number of employee in the department and their average salary.

l) Retrieve the name of all employees who have two or more dependent

m) Retrieve the details of all employees who works on project number 1,2,3

8. Create Table

Client_master (Client_no, name, address, Bdue)
Product_master(P_number, Description, saleprice, costprice)
Sales_master(Salesmno, Sname, Addres, Salamnt, Remarks)
Sales_order(O_no, Client_no, Odate, Delyaddr, Salesmno)
Sales_order_detail(Order_no, Product_no, Qtyorder, product_rate, Qty_dispatched)

Write appropriate queries to perform the following operations:

i) List name of all clients having ‘a’ as the second letter in their names.

ii) Retrieve the description and total Qty sold for each product.

iii) Find product no. and description of non moving products (i.e product not being sold).

iv) For each product being sold, list the product number and the total amount (in Rs.) sold.

v) List all client who stay in ‘Bangalore’ or Mumbai

vi) List the clients who stay in a city whose First letter is ‘M’

vii) Find the names of clients who had purchased the item ‘Trouser’.

viii) Find out if ‘T-Shirt’ has been ordered by any client and if so print the details of the client.

ix) List details of all products whose unit price is more than Rs. 5000.00.

x) Calculate the total amount (in Rs.) purchased by each client that has purchased items amounting more than Rs. 20000.

9. Create table

Author (Author_id, Name, City, Country)
Catalog (Book_id, Title, Author1_id, Author2_id, Publisher_id, Category_id, Year, Price)
Publisher (Publisher_id, Name, City, Country)
Order_details(Order_no, Book_id, Quantity)
Category (Category_id, Description)
Order_summary (Order_no,Member_id,Odate,Amount,Ostatus)
Member(Member_id, Name, Address, Contact)

Assume that all books have at most two authors. Write appropriate queries to perform the following operations:

a) Retrieve the title, author, and publisher names of all books published in 1999 and 2006.
b) Retrieve the title of all books whose one author is ‘A Tanenbum’.
c) Get the details of all books whose price is greater than the average price of the books.
d) Get the names of all the books for which an order has been placed.
e) Get the names of all authors who have more than ten books in the catalog.
f) Get the details of the authors whose books are being sold from the book club.
g) Get the title and price of all books whose price is greater than the maximum of the category average.

REFERENCE BOOKS

1. C.J. Date, *Introduction to database management system.*

2. Elmasri, Navathe, *Fundamentals of data base management system*

3. Bipin C. Desai; *An introduction to Database systems*; Galgotia publications.

4. S.K.Singh; *Database Systems - Concept, Design and Applications*, Pearson Education.

BCA-SE-3014: WEB TECHNOLOGY

(Credit: 2+2=4) (L: 2, P: 4, T: 0)
Theory: 20 Lectures, Practical: 20 Lectures

UNIT 1: Overview of the World Wide Web and the internet (2 Lectures)
A brief history of TCP/IP and the Internet, Internet services-email, telnet, ftp , Internet components, the birth of web, web page, home page, web site, Web browsers-Netscape navigator and IE, Web browser helper applications, Introduction to web servers and their architecture, Review of some popular web servers like Apache, Nginx, Litespeed, Tomcat etc.

UNIT 2: Inside the firewall AND Linking database to the Web (3 Lectures)
Firewall, proxy server, overview of intranet security, web server security, username/password authentication, COM, DCOM, CORBA, JDBC, ODBC- CGI, ASP and PHP, Dynamic page creation and advantages

UNIT 3: HTML editors and tools (5 Lectures)
Basic HTML, HTML tags, creating list in HTML, hyperlinks, multimedia, HTML forms, tables in HTML, frames in HTML, image maps, style sheets in HTML. DHTML, XML-Introduction, syntax, DTD

UNIT 4: Java Script (10 Lectures)
Client side Scripting languages, Creating interactive documents using JavaScript

Practical / Lab work to be performed

HTML ***(At least 15 assignments have to be done from this group)***

1. Create a HTML document consisting of HTML heading, paragraphs and images.
2. Create a HTML document and insert comments in the HTML source code and insert horizontal lines.
3. Construct HTML document to set the font of a text, size of the font, style of the font.
4. Create a HTML document to show how to create hyperlinks.
5. Create a HTML document to use an image as a link.
6. Create a HTML document to open link in a new browser window.
7. Create a HTML document to jump to another part of a document (on the same page).
8. Create a HTML document to insert images from another folder or another server.
9. Create an image-map, with clickable regions.
10. Create a HTML document with all table elements (Table, Caption, Table Row, Table Data element, Table Heading Element, THEAD, TFOOT, TBODY)
11. Create HTML document to make an unordered list, an ordered list, different types of ordered lists, different types of unordered lists, Nested list, Definition list.

12. Create HTML form with the all FORM elements (text fields, password field, Checkboxes, Radio buttons, Select elements, Drop-down list with a pre-selected value, Textarea (a multiline text input field) and buttons.
13. Create HTML document with all Frame elements (FRAMESET, FRAME, NOFRAMES, and INLINE FRAME).
14. Create a HTML document to add AUDIO and VIDEO.
15. Create a HTML document to aligning images (Let the image float to the left/right of a paragraph)
16. Create a HTML document to jump to a specified section within a frame
17. Construct a HTML document with CSS to Set the background colour of a page.
18. Construct a HTML document with CSS to set an image as the background of a page.
19. Construct HTML document with CSS to Set the text color of different elements and align the text.
20. Construct HTML document to set different colours to visited/unvisited links, Specify a background colour for links

XML ***(At least 2 assignments have to be done from this group)***

21. Construct an XML document that contain information about products of an organization and check the validation of the XML document using DTD.
22. Construct an XML document that contain information of 5 students (such as roll no., name , address, class) and check the validation of the XML document using DTD.
23. Construct an XML document that contain details of 10 books and check the validation of the XML document using DTD.

JavaScript ***(At least 10 assignments have to be done from this group)***

24. Write a program in javasrcript to accept a name from the user and display the same name in an alert box.
25. Write a program in javasrcript to display a message in a confirm box.
26. Write a program in javasrcript to display the message “time is running out” in the status bar.
27. Write a program in JavaScript to enter marks of a student and find his/her grade according to the following: if marks>=90 then grade A if marks>=80 then grade B if marks>=70 then grade C if marks>=60 then grade D otherwise, fail.
28. Write a program in JavaScript to create a button and when the button is clicked the message “Hello World” is displayed on an alert box.
29. Write a program in JavaScript to accept 2 nos. from the user and show the working of all arithmetic operators.
30. Write a program in JavaScript to accept 2 strings and concatenate them.
31. Write a program in JavaScript to display the current date and time.
32. Write a program in JavaScript to find the length of an array.
33. Write a program in JavaScript to check whether a string is palindrome or not.
34. Write a program in JavaScript that responds to a mouse click anywhere on the page (using mouse click).

35. Write a program in JavaScript to display the contents of a check box in a alert box.
36. Write a program to validate a form in the user id and password forms.
37. Write a program in JavaScript to create a welcome cookie, Button animation, Image map with added JavaScript Simple timing, Timing event in an infinite loop.

REFERENCE BOOKS

1. Bayross, *Web Enable Commercial Application Development Using HTML, DHTML, JavaScript*, *Perl*, *CGI*, BPB publications, 2000.
2. J. Jawoskri, *Mastering JavaScript*, BPB publications, 1999.
3. Margaret Levine Young – *Internet* - *The Complete Reference* - Millennium Edition – TMT Edition -1999.
4. Harley Hahn - *The Internet* – *Complete Reference* – Second Edition - TMH Edition.

BCA-SE-3024: PROGRAMMING WITH C#

(Credit: 2+2=4) (L: 2, P: 4, T: 0)
Theory: 20 Lectures, Practical: 20 Lectures

UNIT 1: Creation of C# (4 Lectures)

C# family tree,, Relationship in .NET Framework, CLR, Managed vs. unmanaged code, CLS ; **Overview of C#:** Object oriented programming, executing the program in IDE & command line compiler; **Data types, Literals and variables:** Important data type, integers, floating- point, the decimal type, characters, the bool type; Literals; Variables, type conversion & casting, type conversion in Expressions.

UNIT 2: Operators (5 Lectures)

Arithmetic operators, Relational & Logical operators, Assignment operators, Bitwise operators, **Control Statements:** IF statements, Switch Statement, For loop, While loop, Do- while l loop, foreach loop, Break, Continue, goto, **Classes, Objects and Methods:** Class fundamentals, creation of objects, Methods, Constructors and Destructors, new operator, this keyword.

UNIT 3: Arrays & strings (5 Lectures)

One-dimensional array, Multi-dimensional array, Jagged arrays, Strings, **Closer look at methods & classes:** Method overloading, overloading constructors, the Main() method, Recursion, **Operator overloading:** Operator overloading fundamentals, Operator overload on built-in types, overloading relational operators, logical operators, Enabling short-circuit operators.

UNIT 4: Inheritance (3 Lectures)

Basics, Member access & inheritance, Virtual Methods and overriding, Abstract Classes, **Interfaces, Structures & Enumerations:** interfaces, interface references, interfaces can be inherited,Structures.

UNIT 5: Exception Handling (3 Lectures)

Exception handling fundamentals, using multiple catch statements, catching all exception, nesting try blocks, throwing an exception, using finally, **I/O:** The Stream classes, console I/O.

Practical / Lab work to be performed

Each student should do at least 20 assignments from the following list

1. Write a program to check whether the Entered Number is Even or Odd
2. Write a program to Swap 2 Numbers
3. Write a program to Get a Number and Display the Sum of the Digits
4. Write a program to Display the Date in Various Formats
5. Write a program to illustrate the Use of Access Specifies
6. Write a program to Illustrate Left Shift Operations
7. Write a program to Compare Two Dates
8. Write a program to demonstrate Polymorphism
9. Write a program to Demonstrate Multilevel Inheritance

10. Write a program to Illustrate Single Inheritance
11. Write a program to Illustrate Multilevel Inheritance with Virtual Methods
12. Write a program to get the Length of the Array
13. Write a program to reverse an Array
14. Write a program to perform a Selection Sort
15. Write a program to Perform Bubble Sort
16. Write a program to Perform Matrix Addition
17. Write a program to Perform Matrix Subtraction
18. Write a program to Demonstrate Properties of the Class
19. Write a program to Create Obsolete Class
20. Write a program to Demonstrate Pass by Value Parameter
21. Write a program to Combine Two Delegates
22. Write a program to Illustrate Array of Delegates
23. Write a program to Display Results using Delegates
24. Write a program to Create Generic Delegate
25. Write a program to Illustrate Predicate
26. Write a program to Illustrate Actions
27. Write a program to create a Progress Bar Control
28. Write a program to Create Input Box and Display the Text
29. Write a program to Create Radio Button and Demonstrate its Use
30. Write a program to Illustrate Elapsed Event
31. Write a program to Demonstrate Use of Clone
32. Write a program to Demonstrate Trigger Concept
33. Write a program to Create Stop Watch
34. Write a program to Demonstrate IndexOutOfRange Exception
35. Write a program to Demonstrate DivideByZero Exception
36. Write a program to create a File
37. Write a program to Read the Contents of the File
38. Write a program to create a Directory
39. Write a program to Illustrate Handling an Event Declared in an Interface
40. Write a program to Demonstrate IDumpable Interface
41. Write a program to Demonstrate iList Interface
42. C# Program to Demonstrate iDictionary Interface
43. Write a program to create a Simple Thread
44. Write a program to kill a Thread
45. WAP in C# which takes your information (name, age , address, marks etc) as input and print your information.
46. Design an interface for GUI calculator and implement logic for calculator.

REFERENCE BOOKS

1. Herbert Schildt, *TheComplete Reference*. C# 2.0, Tata McGraw-Hill Edition 2006.
2. Jesse Liberty. *Learning C#*, O‟reilly publications,2002.

BCA-SE-3034: OPEN SOURCE SOFTWARE

(Credit: 2+2=4) (L: 2, P: 4, T: 0)

Theory: 20 Lectures, Practical: 20 Lectures

UNIT 1: LaTeX **(8 Lectures)**

Installation of LaTeX, Understanding Latex compilation, Basic Syntax, Writing equations, Matrix, Tables, Page Layout – Titles, Abstract Chapters, Sections, References, Equation references, citation, List making environments, Table of contents, Generating new commands, Figure handling, table & figure numbering, List of figures, List of tables, Generating index, Packages: Geometry, Hyperref, amsmath, amssymb, algorithms, algorithmic graphic, color, tilez listing, Classes: article, book, report, beamer, slides, Applications: Writing Resume, Writing question paper, Writing articles/ research papers, Presentation using beamer

UNIT 2: Scilab **(8 Lectures)**

Introduction to scilab, Installation of Scilab (windows & Linux), Basic syntax, Mathematical Operators, Predefined constants, Built in functions. Complex numbers, Polynomials, Vectors, Matrix operations (functions like inv(), spec(), zeros(), ones(), eye(), rand(), Handling these data structures using built in functions. Programming : Functions , Loops(for & while) , Conditional statements , Handling .sci files , Installation of additional packages e.g. optimization, Graphics handling: 2D, 3D , Generating .jpg files , Function plotting, Data plotting , Applications: Numerical Linear Algebra (Solving linear equations, eigen values etc.) solving Ordinary Differential Equations, Numerical Analysis – iterative methods , GUI in scilab, Plotting 2D graphs, Comparison with C / C++/ Matlab

UNIT 3: Python **(4 Lectures)**

Introduction to Python, The procedure to install Python, How to open Python console, Basic Python commands.

Practical / Lab work to be performed

Each student should do at least 8 assignments from the following list.

1) Calculate the value of x using the following formula in scilab

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where a, b and c are constants.

2) Write a code to check if a number is less than 10, if yes, then display `< 10', if it is greater than 10, then display `> 10', else display the square of the number.

3) Write code to check if a given number n is less than or equal to 10, if yes, display its square.

4) Write a for loop to display all the even numbers between 1 to 50.

5) Write a program to find the sum of a list of numbers.

6) Write a program using while loop to display odd numbers in the range 1 to 25.

7) if $A=\begin{bmatrix} 1 & 4 & 0 \\ -1 & 5 & 8 \\ 4 & 5 & 6 \end{bmatrix}$

a. Find A(:,:)

b. Extract the 2nd column of A

8) Determine the determinant and eigen values of the matrix, A2 + 2* A where A is define in Q.No 7.

9) Define a 3x3 matrix A with all elements equal to 1. Multiply 1st and 2nd row with scalars, 3 and 4 respectively, and determine the determinant of the resultant matrix.

10) A = [2 3 1; 4 6 5; 1 3 6] Use a suitable sequence of row operations on A to bring A to upper triangular form.

11) Solve the following differential equations using Scilab and plot the dependent variable vs independent variable.

a. $\frac{dy}{dx} + \frac{y}{x} = -x^3; (x > 0)$

b. $cos\ (x)\frac{dy}{dx} + si(x)y = x^2 : y(0) = 4$

12) plot sin(x) versus x.(Put a title: “Sine", and labels, `x axis' and `y axis')

13) Plot sin(x) and cos(x) on the same window.

REFERENCE BOOKS

1. http://fossee.in or http://scilab.in
2. http://spoken-tutorial.org/NMEICT-Intro
3. Reliable web resources as recommended by class teacher.

BCA-HG-3016: INTRODUCTION TO INDIAN HISTORY

(Credit: 5+1=6) (L: 5, P: 0, T: 1)
Theory: 60 Lectures, Tutorial: 15 Lectures

UNIT 1: (12 Lectures)

Features of Indus Valley Civilization, Condition of India in Vedic period, Maurya dynasty with reference to Asoka's administration

UNIT 2: (12 Lectures)

Gupta Period: Samudragupta and Chandragupta II, Harshavardhana-relation with Kamrupa, visit of Hiuen Tsang

UNIT 3: (12 Lectures)

Foundation of Muslim rule in India: Iltutmish, Balban, Alauddin Khalji, and Muhammad-Bin-Tughluq, Rise of Mughal power in India: Akbar and Aurangzeb, Sivaji: character and achievements

UNIT 4: (12 Lectures)

Arrival of Europeans and establishment of British power after Battle of Plassey, Revolt of 1857

UNIT 5: (12 Lectures)

Birth of Indian National Congress and Swadeshi Movement, Non-Cooperation Movement and Civil Disobedience Movement, Quit India Movement and independence

REFERENCE BOOKS

1. *Modern Indian History*, B L Grover, S L Grover
2. *Medieval India: from Sultanate to Mughals-Mughl Empire*, Satis Chandra
3. *History of Ancient India*, K C Choudhury
4. *Ancient India in Historical Outline*, D N Jha

BCA-HG-3026: POSITIVE PSYCHOLOGY

(Credit: 5+1=6) (L: 5, P: 0, T: 1)
Theory: 60 Lectures, Tutorial: 15 Lectures

UNIT 1: Introduction **(10 Lectures)**

Positive psychology: Definition; goals and assumptions; Brief history of Positive psychology, Relationship with other fields of psychology, Scope of positive psychology.

UNIT 2: Positive emotions **(6 Lectures)**

Positive emotions: concept and theory; Cultivating positive emotions; Relevance of positive emotions.

UNIT 3: Happiness and Well-Being **(17 Lectures)**

Happiness- hedonic and Eudemonic approaches; Well- being: negative vs positive functions; Subjective well –being: Emotional, social and psychological well-being, Martin Seligman's model of well-being and happiness: PERMA model

UNIT 4: Positive Cognitive States: Resilience and Optimism **(17 Lectures)**

Resilience: perspectives; Sources of resilience in childhood, adulthood and later life; Optimism-How optimism works; variation of optimism and pessimism; Explanatory or attributional style ofexplaining life events.

UNIT 5: Applications of Positive Psychology **(10 Lectures)** Positive schooling: Components; Positive coping strategies, Mental health: Moving toward balanced conceptualization; Mindfulness, Essential steps to mindfulness.

REFERENCE BOOKS

1. Snyder, C.R. & Lopez, S.J. (2002). *Handbook of positive psychology.* (eds.). New York: Oxford University Press.
2. Baumgardner, S.R & Crothers, M.K.(2009). *Positive Psychology.* U.P: Dorling Kindersley PvtLtd.
3. Carr, A. (2004). *Positive psychology, The science of happiness and human strengths.*New York: Routledge.
4. Singh, A.(2013).*Behavioral science: Achieving behavioral excellence for success.* New Delhi:Wiley India Pvt ltd.