5th Semester:-

BCA – 501: Relational Database Management System

Total Lectures = 50

Unit – I

Introduction & features: Concept of RDBMS, Properties of RDBMS, CODD commandments

- SQL plus
- Data manipulations in RDBMS
- Oracle data type

Table

- Creation, insertion, updation, deletion of data contents
- Modification of structure
- Removing, deleting, dropping of tables
- Select command

Unit II

Data constraints

Column level & table level constructions, Null, unique key, default, foreign key reference, CHECK integrity constraints, Defining different constraints on the table, Defining integrity constraints in the alter table command.

Unit III

Computations in Expression Lists used to Select Data

Logical operators, Range searching, Pattern searching, Oracle functions, Grouping data frame table in SQL, Manipulations data in SQL

Joins

Joining multiple tables (equi-joins), Joining table to itself (self joins) sub queries

Union, intersect & minus clause.

Unit IV

Indexes Views

Creation, updation, destroying, selections of data, Renaming the column of view, Granting permissions, Permission on the objects created by the user, GRANT statement, Object privileges, Referencing the tables to the another user, Revoking the permissions given

Unit V

PL/SQL

- Performance, portability, data types, character set, syntax, block structure
- Oracle transactions
- Locks

Unit VI

- Cursors
- Error handling
- Procedure and functions
- Concept, creation, execution, advantages, syntax, deletion
- Triggers
- Concept, use, how to apply database triggers, type of triggers syntax, deleting

Text Books:

1. SQL & PL/SQL For Oracle 11g Black Book, Dr. P.S.Deshpande, Dreamtech Press
2. SQL, PL/SQL The Programming Language Of Oracle , Ivan Bayross,
3. Commercial Application Development using Oracle Developer 2000, Ivan Bayross, BPB Publ.
4. Learning Oracle SQL and PL/SQL- A Simplified Approach, Rajeeb C. Chatterjee,PHI
5. Oracle - The Complete Reference, Oracle Press, TMH Edition.
6. SQL- A Complete Reference, Alexis Leon & Mathews Leon, TMH

BCA – 502: Artificial Intelligence through Python

Total Lectures = 50

Unit – I: Introduction to Python

- **1.1** Installation and Working with Python
- **1.2** Understanding Python variables
- **1.3** Python basic Operators
- **1.4** Understanding python blocks
- **1.5** Declaring and using Numeric data types: int, float, complex
- **1.6** Using string data type and string operations
- **1.7** Defining list and list slicing
- **1.8** Use of Tuple data type
- **1.9** Conditional blocks using if, else and elif
- **1.10** Simple for loops in python
- **1.11** For loop using ranges, string, list and dictionaries
- **1.12** Use of while loops in python
- **1.13** Loop manipulation using pass, continue, break and else
- **1.14** Programming using Python conditional and loops block

Unit – II Python Functions, Modules And Packages

- **2.1** Organizing python codes using functions
- **2.2** Understanding Packages
- **2.3** Powerful Lambda function in python
- **2.4** Programming using functions, modules and external packages
- **2.5** Understanding string in build methods
- **2.6** List manipulation using in build methods
- **2.7** Dictionary manipulation

Unit – III: Python File Operation

- **3.1** Reading config files in python
- **3.2** Writing log files in python
- **3.3** Understanding read functions, read(), readline() and readlines()
- **3.4** Understanding write functions, write() and writelines()
- **3.5** Powerful pattern matching and searching
- **3.6** Password, email, url validation using regular expression

Unit – IV: Python Exception Handling and Data Base

- **4.1** Avoiding code break using exception handling
- **4.2** Safe guarding file operation using exception handling

- **4.3** SQL Database connection using python
- **4.4** Creating and searching tables
- **4.8** Programming using database connections

Artificial Intelligence:

Unit – V: Search

- **5.1** Uninformed
- **5.2** Informed
- **5.3** Mini-Max for Game Playing

Unit – VI:

- 6.1 Task Planning
- 6.2 Robot Motion Planning
- 6.3 Supervised Learning
- 6.4 Unsupervised Learning
- 6.5 Reinforcement Learning

Text Books:

1. Dan.W. Patterson, Introduction to A.I and Expert Systems – PHI, 2010
2. Russell & Norvig, Artificial Intelligence- A Modern Approach, LPE, Pearson Prentice Hall, 2005.
3. Mark Pilgrim , A press, "Dive Into Python"
4. Swapnil Saurav, Ekapress (2018), Learn and Practice Python
5. Rajendra Akerkar, Introduction to Artificial Intelligence, PHI
6. Stuart Russel, Peter Norvig, Artificial Intelligence-A Modern Approach, Pearson
7. N.P.Padhy, Artificial Intelligence and Intelligent Systems, Oxford Univ. Press

BCA – 503: Web Technology (HTML, Java Script, CSS)

Total Lectures = 50

Unit – I: Fundamentals:
WWW, Internet, Web Browsers, Web Servers, URLs, MIME, HTTP.
Unit – II: HTML:
Origins of HTML, Basic syntax, Standard HTML page structure, Text markup, Images, HyperLinks, Lists, Tables and Form.
Unit – III: CSS:
Introduction, Selectors, Font attributes, List attributes, Color, Alignment of text, The Box model, Background images, The and tags.
Unit - IV: Java Script:
Overview, Object notation, Operations, expressions, browser output, keyboard input, Control statements, Object creation, Arrays, Functions, Pattern matching using expressions, error handling, The Document Object Model, Element access, Events and event handling.
Text Books:
1. Robert W Sebesta, "Programming the World Wide Web" Pearson Education.
2. M.Deitel, P.J.Deitel, A.B.Goldberg, "Internet & World Wide Web How to program", Pearson.
3. Chris Bates, "Web Programming Building Internet Applications", Wiley India.
4. Jibitesh Mishra, Joel Sklar, Don Gosselin, "The Web Warrior Guide to Web Design Technologies", Cengage Learning India.
5. Uttam K. Roy, "Web Technologies", Oxford Press

BCA – 504: Computer Network, Security and Cyber Law

Total Lectures = 50

Unit – I: Computer Network:

Introduction: Definition, its use, goals and structure, network architecture, ISO reference model, Network Model, Connecting Devices, TCP/IP, UDP

Network Topology: Topology Design process, connectivity analysis, Delay analysis, Backbone design, Logical Access Design.

Unit – II: Physical Link Layer: Theoretical basis for data communication, Data and signal, Digital and Analog transmission, transmission media, Switching, multiplexing.

Unit – III: Data Link protocols, Data Link controls, Sliding window protocols, Virtual circuits, Routing algorithms, Congestion, Examples of network layers, selected examples, Error detection and correction, Multiple Access, Congestion control, Framing, MAC Sublayer. IPv4, IPv6 Address, ICMP, IGMP

Unit – IV: Network Security:

Introduction: Security Overview, Cyber security fundamentals, Security System design architecture, The OSI Security Architecture tools and techniques, Current Vulnerabilities - Different Security attacks, Countermeasures, Security Services, Model for Network Security.

Symmetric Cipher: Classical Encryption techniques, Symmetric Cipher Model, Block Cipher Design principles – Feistel Structure, DES, Triple DES, Advanced Encryption Standard (AES), Stream Cipher and RC4.

Unit-V:

Public Key Encryption: Message Authentication, RSA Algorithm, Digital Signature.

Network Security Algorithms: Kerberos, X.509, Authentication Services.

System Security: Intrusion Detection, Password management, Virus countermeasure, Firewall.

Unit – VI: Introductory Concept of Cyber Laws: IT Laws, policies and Government Regulations – Global, IT Act – India.

Text Books:

1. Computer Networks, A.S.Taenenbaum, Pearson
2. Data Communications and Networking, Behrouz Forouzan, TMH
3. Computer Networks, William Stallings, Pearson
4. Computer Networks and Internets, Douglas E. Comer, Pearson
5. Data Communications and Computer Networks, Prakash C. Gupta, PHI
6. Network Security Essentials – Applications and standards, William Stallings, Pearson.
7. Cryptography and Network Security– Principles and Practices, W. Stallings, Pearson, 2018
8. Cryptography and Network Security, Behrouz Forouzon, TMH
9. Introduction to Cryptography, Johannes A. Buchmann, Springer
10. Security in Computing, Charles P. Pfleeger and S.L.Pfleeger, Pearson, 4e, 2011.
11. Cyber Law – The Indian Perspective, Pawan Duggal, Saakshar Law Publications
12. CYBER SECURITY LAW Kindle Edition, by PAVAN DUGGAL
13. Cyber Law Simplified, by Vivek Sood, TMH

BCA – 505: Lab on Oracle

Total Lab Class = 60

SQL commands-

Create, alter, drop, truncate, rename

Constraints- Primary key, unique, null, foreign key, default, check

Select, insert, update, delete, connect, revoke, grant, rollback, commit

Oracle functions, index, views (creation, deletion, updating, inserting)

Locking, Making Procedure, Making functions, Cursor programs, Triggers programs

Text Books:

1. SQL & PL/SQL For Oracle 11g Black Book, Dr. P.S.Deshpande, Dreamtech Press
2. SQL, PL/SQL The Programming Language Of Oracle , Ivan Bayross,

BCA – 506: Lab on Python & Web Technology:

Total Lab Class = 60

Python Programming

Programming in Python Lab Practical:

Program 1. Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature.

Program 2. Using while loop, produce a table of sins, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x).

Program 3. Write a program that reads an integer value and prints —leap year‖ or —not a leap year.

Program 4. Write a program that takes a positive integer n and then produces n lines of output shown as follows. For example enter a size: 5 * ** *** **** *****

Program 5. Write a function that takes an integer _n' as input and calculates the value of 1 + 1/1! + 1/2! + 1/3! + ... + 1/n

Program 6. Write a function that takes an integer input and calculates the factorial of that number.

Program 7. Write a function that takes a string input and checks if it's a palindrome or not.

Program 8. Write a list function to convert a string into a list, as in list (_abc') gives [a, b, c].

Program 9. Write a program to generate Fibonacci series.

Program 10. Write a program to check whether the input number is even or odd.

Program 11. Write a program to compare three numbers and print the largest one.

Program 12. Write a program to print factors of a given number.

Program 13. Write a method to calculate GCD of two numbers.

Program 14. Write a program to create Stack Class and implement all its methods. (Use Lists).

Program 15. Write a program to create Queue Class and implement all its methods. (Use Lists)

Program 16. Write a program to implement linear and binary search on lists.

Program 17. Write a program to sort a list using insertion sort and bubble sort and selection sort.

B.R.A. Bihar University, Muzaffarpur

Web Technology:

HTML code for sign up, sign in, forgot password pages.
CSS code to control the appearance of form elements of the HTML page.
JavaScript program to:

- check whether a number is even or odd
- check whether a year is leap or not
- find factorial of a number
- display table of a number
- validate input elements of a signup page
- similar programs based on array, function.
- even based coding.

A Mini Project