Program Structure and Syllabus

BTech (Artificial Intelligence) II Year (I & II Semesters)

R20 Regulations

Department of Artificial Intelligence

ANURAG UNIVERSITY

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BTech (AI) II YEAR I SEMESTER [6 T + 2 P + 1 M]

S. No	Course Code	Category	Course	Hours per week			Credits
				L	T	P	
1	A53029	ESC	Computer Systems I	3	0	0	3
2	A53025	PCC	Data Structures	3	0	0	3
3	A53026	PCC	Python Programming	2	0	0	2
4	A53027	BSC	Discrete Mathematics	3	0	0	3
5	A53030	BSC	Probability and Statistics	3	0	0	3
6	A53031	PCC	Java Programming	2	1	0	3
7	A53215	PCC-Lab	Python Programming Lab	0	0	3	1.5
8	A53216	PCC-Lab	Data Structures & Java Lab	0	0	3	1.5
9	A53007	MC	Environmental Studies	2	0	0	0
			TOTAL	18	1	6	20

BTech (AI) II YEAR II SEMESTER [5 T + 3 P + 1 M]

S.No	Course Code	Category	Course	Hours per week			Credits
				L	T	P	
1	A54028	PCC	Data Wrangling and Visualization	2	1	0	3
2	A54026	PCC	Design and Analysis of Algorithms	3	1	0	4
3	A54029	PCC	Fundamentals of Artificial Intelligence	2	1	0	3
4	A54030	PCC	Fundamentals of Software Engineering	3	0	0	3
5	A54027	PCC	Data Base Management Systems	3	0	0	3
6	A54217	HSS & MC Lab	Soft Skills for Success Lab	0	0	2	1
7	A54218	PCC-Lab	Data Wrangling and Visualization Lab	0	0	3	1.5
8	A54219	PCC-Lab	Database Management Systems Lab	0	0	3	1.5
9	A54022	MC	Gender Sensitization	2	0	0	0
			TOTAL	15	3	8	20

*** L – Lecture, T – Tutorial, P - Practical**

COMPUTER SYSTEMS I

BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53029	ESC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Course Objectives

1. Learn various number systems
2. Apply Boolean Algebraic principles
3. Design various combinational and sequential circuits
4. Describe the basic organization of computer
5. Analyze various issues related to memory hierarchy

Course Outcomes

After completion of the course student will be able to:

1. Understand various number systems, floating point representations, complements, error detecting and correcting codes
2. Apply Boolean algebraic principles and k-maps for simplification of Boolean functions
3. Design combinational circuits – multiplexer, adder and sequential circuits using flip-flops
4. Describe the basic organization of computer
5. Learn the memory hierarchy

UNIT-I

Signals and Number Systems: Analog Signals, Digital Signals, Number Systems (Converting Binary to Decimal, Decimal to Binary; Decimal Fraction to Binary, Hex to Binary), Binary additions, Complement and Two's Complement, Unsigned and Signed magnitude, Signed Two's complement Binary Number, Binary Addition using Two's Complement, Floating Point Representation, Binary-Coded Decimal (BCD), Coding Schemes(ASCII and Universal Code), Parity Bit, Clock, Transmission Modes (Asynchronous and Synchronous), Transmission Methods (Serial and Parallel)

UNIT-II

Boolean Logics and Logic Gates: Boolean Logics and Logic Gates, Integrated Circuit Classification, Boolean Algebra Theorems, Boolean functions

Min terms, Max terms, Karnaugh Map and Universal Gates: Min terms, Max terms, Karnaugh Map (Three and Four Variable K- Map), Sum of Products and Product of Sums, Don't Care Conditions, Universal Gates

UNIT-III

Combinational Logic: Analysis of Combinational Logics, Design of Combinational Logics, Decoder, Encoder, Multiplexer, Half and Full Adder, Binary Adder and Subtractor, Arithmetic Logic Unit

UNIT-IV

Sequential Logic: S-R Latch, D Flip-Flop, J-K Flip-Flop, T Flip-Flop, Register, Frequency Divider Using J-K Flip-Flop, Analysis of Sequential Logics, State Diagrams, Flip-Flop Excitation Table, Counter

UNIT-V

Introduction to Computer Architecture: Introduction, Components of a Microcomputer, CPU Technology, CPU Architecture, Intel Microprocessor Family, Multicore Processors, CPU Instruction Execution, Disk Controller, Microcomputer Bus, FireWire.
Memory: Semiconductor Memory, Hard Disk, Solid-State Drive (SSD), Memory Hierarchy

Text Book

1. Ata Elahi, Computer Systems Digital Design, Fundamentals of Computer Architecture and Assembly Language, Springer International Publishing, 2018

References

1. Irv Englander, The Architecture of Computer Hardware, Systems Software, & Networking An Information Technology Approach, 5th Edition, Wiley 2014
2. M. Morris Mano and Michael D. Ciletti, Digital Design, 5th Edition, Pearson Education, 2012
3. A. Anand Kumar, Switching Theory and Logic Design, 3rd edition, PHI, 2016
4. M. Morris Mano, Computer System Architecture, Revised Third Edition, Pearson/PHI, 2017.
5. Carl Hamacher, Zvonks Vranesic, SafeaZaky, Computer Organization, 5th Edition, McGraw Hill 2011

DATA STRUCTURES

BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53025	PCC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Course Objectives

1. Understand various static and dynamic representations of data structures
2. Understand fundamental algorithmic problems of various non-linear data structures
3. To be familiar with Graph representations and traversals
4. Know the basic concepts of Hashing

Course Outcomes

After completion of the course student will be able to:

1. Examine Static and Dynamic data structures in implementing Stack applications (L4)
2. Apply Tree traversal algorithms in solving real time applications (L3)
3. Analyze the concepts of Advanced Trees to generate search efficiently (L4)
4. Interpret the importance of Graphs in solving real time applications (L5)
5. Examine the concepts of hashing, collision and its resolution methods using hash function (L4)

UNIT-I

Introduction: What is data structure, Types of data structures, Static and Dynamic representation of data structure and comparison. Stacks- definition, operations, Applications of stacks – Representation and evaluation of expressions using Infix, Prefix and Postfix, Algorithms for conversions and evaluations of expressions from infix to prefix and postfix using stack, Towers of Hanoi, Parenthesis checker.

UNIT-II

Trees: Basic terminology, Types of trees: Binary Tree: terminology, Complete and Full Binary Tree, Extended Binary Trees, Threaded Binary Trees-In-order Threading. Representation of Trees using Arrays and Linked lists (advantages and disadvantages). Tree Traversal and Representation of Algebraic expressions; Algorithms for Tree Traversals

Heaps: Introduction, types of Heaps – Min binary heap, Max binary heap.

UNIT-III

Advanced concepts on trees: Representation and Creation of Binary Search Trees (BST), Algorithm for Inserting, deleting and searching in BST representation and advantages of AVL Trees, algorithms on AVL Trees-Insertion, Rotation and Deletion. Definition and advantages of B-Trees, B-Tree of Order M, operations - Insertion and Searching, Introduction to Red-Black Trees and Splay Trees.

UNIT-IV

Graphs-Basic terminology, Representation of graphs: sequential representation (Adjacency, Path Matrix), Linked representation.

Graph Traversals-Breadth First Search, Depth First Search with algorithms. Spanning Trees - Definition and properties, Minimum Spanning Tree, Dijkstra Algorithms.

UNIT-V

Hashing: General Idea, Hash Functions, Collision Resolution- Separate Chaining, Open Addressing-Linear probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing, Implementation of Dictionaries.

Text Books

1. Seymour Lipschutz, Schaum's Outlines Data Structures, Special Second Edition, Tata McGraw-Hill
2. Richard F.Gillberg & Behrouz A. Forouzan, Data Structures, A Pseudo code Approach with C, Second Edition, Cengage Learning, India Edition, 2005

References

1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, Data Structures Using C and C++, PHI Learning Private Limited, Delhi India
2. Horowitz and Sahani, Fundamentals of Data Structures, Galgotia Publications Pvt. Ltd Delhi India
3. A.K. Sharma, Data Structure Using C, Pearson Education India

PYTHON PROGRAMMING

BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53026	PCC	L	T	P	C	CIE	SEE	Total
		2	0	0	2	40	60	100

Course Objectives

1. Understand the basics and functions of Python Programming Language.
2. Understand the string operations and sequences used in Python Programming Language.
3. Understand the data structures used in Python Programming Language.
4. Know the classes and objects in Python Programming Language.
5. Use the reusability concepts in Python Programming Language.

Course Outcomes

After completion of the course student will be able to:

1. Apply control structures, functions and packages in Problem Solving. (L3)
2. Analyze various String handling functions and data structures (L4)
3. Model the object-oriented problems with classes and objects (L4)
4. Solve the problems by using Inheritance and polymorphism (L3)
5. Illustrate programs on Exception Handling and various packages (L3)

UNIT-I

Introduction to Python: Features of Python Programming Language, Data Types, Operators, Expressions, Control Statements, Standard I/O Operations.

Functions and Modules: Declaration and Definition, Function Calling, More on Defining Functions, Recursive Functions, Modules, Packages in Python, Doc Strings.

UNIT-II

Strings and Regular Expressions: String Operations, Built-in String Methods and Functions, Comparing Strings, function in Regular Expression.

Sequence: List, Tuples, Dictionaries, Sets.

UNIT-III

Introduction to Object Oriented Programming: Features of OOPs, Merits and Demerits of Object Oriented Programming Languages, Applications of OOPs

Implementation of classes and objects in Python: Classes and Objects, Class Method and Self Argument, The __init__Method, Class Variables and Object Variables, The __del__ Method, Public and Private Data Members, Private Methods, Built-in Functions to Check, Get, Set and Delete Class Attributes, Garbage Collection (Destroying Objects).

UNIT-IV

Implementation of Inheritance in Python: Inheriting Classes in Python, Types of Inheritance, Abstract Classes, Interfaces and Meta class.
Implementation of Operator Overloading in Python: Introduction, Implementing Operator Overloading, Overriding Methods.
Exception Handling in Python: Introduction, Exception Hierarchy, Handling Exception, Multiple Except Blocks and Multiple Exceptions, Finally Block.

UNIT-V

Python NumPy: NumPy ND array, Data Types, Functions of NumPy Array, NumPy Array Indexing, Mathematical Functions on Arrays in NumPy.
Python Pandas: Pandas Features, Dataset in Pandas, Data Frames, Manipulating the Datasets, Describing a Dataset, group by Function, Filtering, Missing Values in Pandas, Concatenating Data Frames. Import data from csv file.
Introduction to Matplotlib: Plot, Scatterplot, Introduction to Tkinter, Date and Time Packages.

Text Books

1.ReemaThareja, Python Programming using Problem Solving Approach, First Edition, Oxford Higher Education.
2. James Payne, Beginning Python using Python 2.6 and Python 3

References

1. Kenneth A. Lambert, Fundamentals of Python
2. Charles Dierach, Introduction to Computer Science using Python

DISCRETE MATHEMATICS

BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53027	BSC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Course Objectives

1. Interpret the Sets, syntax and semantics of propositional and predicate logic
2. Solve applications involving Permutations and Combinations
3. Formulate Recurrence relations to solve problems involving an unknown sequence
4. Explain the concepts of Relations and Graphs
5. Illustrate the Algebraic Systems

Course Outcomes

After completion of the course student will be able to:

1. Analyze Statement Logic and Predicate Logic.(L4)
2. Apply the principles of Permutations and Combinations with repetition & without repetitions(L3)
3. Solve Recurrence Relations by using generating functions(L3)
4. Apply the knowledge of Relations and Graph Theory in the field of Computer Science.(L3)
5. Analyze the Algebraic Systems with their properties(L4)

UNIT-I

Foundations: Basics, Sets and Operations of Sets, Fundamentals of Logic, Logical Inferences, First order logic and other methods of Proof, Rules of Inference for Quantified Propositions. (Problems Only and Theorems without Proofs)

UNIT-II

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumerating Combinations and Permutations with & without repetitions, constrained repetitions, and Principle of Inclusion and Exclusion. (Problems Only and Theorems without Proofs)

UNIT-III

Recurrence Relations: Generating Functions, Calculating coefficient of Generating Function, Solving Recurrence relations by substitution method and Generating Functions, The Method of Characteristic Roots, Solutions to inhomogeneous recurrence relations. (Problems Only and Theorems without Proofs)

UNIT IV

Relations and Digraphs: Relations and Directed Graphs, Special Properties of Binary Relations, Equivalence Relations, Ordering Relations, Lattices, Operations on Relations, Paths and Closures, Directed Graphs and adjacency matrices. (Problems Only and Theorems without Proofs);

Graphs: Basic Concepts, Isomorphism's and Sub-graphs, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs. (Problems Only and Theorems without Proofs)

UNIT V

Algebraic structures: Algebraic systems, examples and general properties, semi groups and monoid groups, sub groups, homomorphism, isomorphism, rings. (Problems Only and Theorems without Proofs)

Text Books

1. Joe L. Mott, Abraham Kandel, Theodare P. Baker, "Discrete Mathematics for Computer Scientists and Mathematicians", Second Edition, PHI, 2019.
2. J.P. Tremblay and P. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, 2007

References

1. K. H. Rosen, "Discrete Mathematics and its Applications with Combinatorics and Graph Theory", 7th Edition, Tata McGraw Hill
2. S. K. Chakraborthy and B.K. Sarkar," Discrete Mathematics ", Oxford, 2011.
3. C. L. Liu and D. P. Mohapatra, "Elements of Discrete Mathematics-A Computer Oriented Approach", 3rd Edition, Tata McGraw Hill

PROBABILITY & STATISTICS

BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53030	BSC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Course Objectives

1. To perform various types of averages and dispersion, polynomial curve fitting, general curve fitting and interpolation, various types of Skewness and kurtosis, Correlations.
2. Understand chance cause and random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
3. In the discrete case, study the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
4. Estimation of statistical parameters, testing of hypothesis of few unknown statistical parameters.
5. Understanding the experiments.

Course Outcomes

After completion of the course student will be able to:

1. To understand the concept of Average and Dispersions, and interpolate using curve fitting and identify the correlation between variables.
2. Identify distribution in certain realistic situation. It is mainly used for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables involved in the probability models. It is quite useful for all branches of engineering.
3. To understand discrete and continuous distributions.
4. Calculate mean and proportions of large sample and to make important decisions from few samples which are taken out of unmanageably huge populations. It is mainly useful for non-circuit branches of engineering. To estimate an unknown population parameter.
5. Design their experiment with the basic norms and test their design efficiency. It is useful to all the branches of engineering.

UNIT-I

Measures of Central tendency, Dispersion, Moments, Skewness and Kurtosis.

Curve fitting by the method of least squares- fitting of straight lines, second degree parabola and more general curves. Correlation, Rank correlation and Regression.

UNIT-II

Introduction to Probability, Addition theorem, Multiplication theorem (Two events only), Baye's theorem.

Random variables, Discrete and continuous random variable, Definitions of Probability Distribution function, Probability mass function, Probability density function and properties. Definitions of Mathematical expectation, Variance of discrete and continuous random variable. Bivariate distributions and their properties, marginal and conditional distribution.

UNIT-III

Discrete Distributions: Bernoulli, Binomial, Poisson distributions (definition and problems) their mean, variance and moment generating function.

Continuous Distribution: Normal distribution, Exponential distribution (definition and problems) related properties.

UNIT-IV

Estimation: Concept of Point estimation and its properties (definition only), Concept of Interval estimation with examples.

Testing of Hypothesis: Null & Alternative Hypothesis, Critical region, Type I and Type II errors, level of significance, one tail, two-tail tests.

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means

UNIT-V

Small Sample tests: t-test for single mean, difference of means, paired T-test, F-test.

Chi-square test for goodness of fit and independence of attributes.

ANOVA: Introduction, ANOVA for One way and Two way classification.

Text Books

1. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press
2. Probability and Statistics for Engineers by Richard A Johnson, Pearson Education

References

1. Fundamentals of Mathematical Statistics by S.C Gupta and V.K Kapoor Sultan Chand & Sons.

2. Miller and John E.Freund, Probability & Statistics for Engineers, Prentice Hall of India

3. Montgomery: Design and Analysis of Experiments, Wiley

JAVA PROGRAMMING

BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53031	PCC	L	T	P	C	CIE	SEE	Total
		2	1	0	3	40	60	100

Course Objectives

1. Understand the concept of OOP and learn the basic syntax and semantics of the Java language and programming environment
2. Be familiar with the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading
3. Understand Exceptional handling and multithreading concepts
4. Be familiar with GUI applications

Course Outcomes

After completion of the course student will be able to:

1. Explain the Object Oriented Programming concepts(L2)
2. Design programs using Package and Interfaces.(L6)
3. Apply the concepts of Exceptions and Multithreading.(L3)
4. Develop GUI applications and AWT using Frames (L6)
5. Design the programs using Applet and JDBC Concepts(L6)

UNIT-I

Java Basics: History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple Java program, concepts of classes, objects, constructors, methods, access control, this keyword, static keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, Strings.

UNIT-II

Inheritance: Introduction, forms of Inheritance - specialization, specification, construction, extension, limitation, combination, Member access rules, Super uses, using Final with Inheritance

Polymorphism: method overriding, abstract classes, Object class.

Packages and Interfaces: Defining, Creating and Accessing a Package, Understanding Classpath, importing packages, differences between classes and interfaces, File, Byte Streams, Character Streams.

UNIT-III

Exception handling: Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Package java.util - The Collection Interface, List Interface, Queue Interface, the Collection class - LinkedList Class, HashSet Class. TreeSet Class, StringTokenizer, Date, Random, Scanner.

Multi-Threading: Differences between multi-threading and multi-tasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication.

UNIT-IV

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

AWT: class hierarchy, component, container, panel, window, frame, graphics class, Layout Managers – border, grid, flow, card and grid bag.

UNIT-V

AWT Controls: Labels, Buttons, Scrollbars, Text components, Check box, Check box groups, Choice, Menu bar.

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, create applets, passing parameters to applets.

JDBC Connectivity: JDBC Type 1 to 4 Drivers, Connection establishment, Query Execution

Text Books

1. Java- The Complete Reference, Seventh Edition, Herbert Schildt, Tata McGraw Hill
2. Database Programming with JDBC & JAVA, Second Edition, George Reese, O'Reilly Media

References

1. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.
2. Thinking in Java Fourth Edition, Bruce Eckel
3. Introduction to Java programming, Y. Daniel Liang, Pearson Education

PYTHON PROGRAMMING LAB

BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53215	PCC-Lab	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

Course Objectives

1. Understand the string operation and sequences used in Python Programming Languages
2. Know the classes and objects in Python Programming Language
3. Use the reusability concepts in Python Programming Language
4. Use Exception Handling mechanism in Python Programming Language

Course Outcomes

After completion of the course student will be able to:

1. Develop programs on data types, operators and expressions
2. Apply the data structures in real time scenarios
3. Write the programs on strings and functions
4. Implement programs on class and related issues
5. Use of python exception handling and packages

Week-1

Installation and Environment set up of Python & Programs on Data types

Week-2

Programs on Standard I/O, Operators and Expressions

Week-3

Programs on Functions

Week-4

Programs on different argument types

Week-5

Programs on lists and Tuples

Week-6

Programs on Dictionaries

Week-7

Programs on Strings and string operations

Week-8

Programs on Regular Expressions

Week-9

Programs on class & object, static and instance method implementation

Week-10

Programs on Inheritance and Polymorphism

Week-11

Programs on Abstract classes and interfaces

Week-12

Programs on Exception Handling

Week l3

Demonstration of Numpy package

Demonstration of Pandas package

Week-14

Demonstration of matplotlib package

Week-15

Demonstration of Tkinter package

DATA STRUCTURES & JAVA LAB

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BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53216	PCC-Lab	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

Course Objectives

1. To design and analyze simple linear and non-linear data structures.
2. To design and implement various data structure algorithms
3. To identify and apply the suitable data structure for the given real world problem
4. To design and implement OOPs concepts
5. To implement Abstract classes, Interfaces and Packages
6. To implement Exceptional handling and Multithreading
7. To design and implement GUI applications

Course Outcomes

After completion of the course student will be able to:

1. Develop the programs on stacks and its applications
2. Demonstrate the operations on trees
3. Demonstrate the implementation of various advanced trees
4. Design and implementation of programs on BST and Graph Traversals
5. Explain Java Environment and use of Java Development Kit for the creation and execution of Java programs
6. Develop programs on various concepts like data abstraction & data hiding, Encapsulation, inheritance, polymorphism
7. Develop the programs using interfaces and packages
8. Create and use threads and handle exceptions

Part-A

1. Program to illustrate string built in functions
2. Program to evaluate postfix notations
3. Program to convert infix to postfix notation
4. Program to illustrate tree traversals
   a) In order b) Preorder c) Post order
5. Program to illustrate insertion, deletion and searching in Binary Search Tree.
6. Program to illustrate Graph traversals
   A) Breadth First Search
   B) Depth First Search

7. Program to illustrate Insertion, deletion and Rotation on AVL Trees

Part-B

1. a) Write a Java Program to define a class, define instance methods for setting and retrieving values of instance variables and instantiate its object
   b) Write a program to find total, average of given two numbers by using static keyword and this keyword?
   c) Write a program to illustrate types of constructors and constructor overloading

2. a) Write a java program to illustrate Method overloading
   b) Write a Java program to practice using String class and its methods
   c) Write a program to illustrate parameter passing Techniques

3. a) Write a program to illustrate types of inheritance.
   b) Write a program to illustrate the use of creation of packages
   c) Write a java program to illustrate Method Overriding

4. a) Write a program to illustrate Interfaces
   b) Write a program to illustrate Files

5. a) Write a program to illustrate try, catch, throw, throws and finally keywords
   b) Write a program to implement the concept of User defined Exceptions

6. a) Write a program to illustrate String Tokenizer, Date, Random and Scanner Classes?
   b) Write a program to illustrate collection classes and interfaces
   c) Write a program to illustrate Multithreading

7. a) Write a program to illustrate passing parameters to applet
   b) Write a program to illustrate Event Handling (keyboard, Mouse events)

8. a) Write a program to illustrate AWT controls.
   b) Write a program to develop a calculator application using AWT

ENVIRONMENTAL STUDIES

BTech (AI) II Year I Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A53007	MC	L	T	P	C	CIE	SEE	Total
		2	0	0	0	--	--	--

Course Objectives

1. To introduce the knowledge about Environment
2. To introduce students to the concepts of pollution, Biodiversity
3. To develop an awareness about global Environmental problems
4. To learn to protect environment and awareness on legal issues
5. To learn about importance of sustainable development and role of IT in environment

Course Outcomes

After completion of the course student will be able to:

1. Understand fundamental physical and biological principles that govern natural processes
2. Understand fundamental concepts from the social sciences and humanities underlying environmental thought and governance
3. Integrate and apply perspectives from across the natural sciences, social sciences, and the humanities in the context of complex environmental problems
4. Communicate integrated perspectives on complex environmental problems in the form of written and oral argument to both professional and lay audiences
5. Design and conduct independent research that contributes to environmental thought and/or problem solving

UNIT-I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance— Need for Public Awareness. Ecosystems: Concept of an ecosystem — Classification, structure and function of different ecosystems - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids. Biodiversity and its conservation: Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts. ICUN categories of biodiversity and RED DATA book - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

UNIT-II

Natural Resources: Renewable and non-renewable — Natural resources and associated problems: Forest resources — Use and over — exploitation, deforestation,— Timber extraction, mining, dams and other effects on forest and tribal people: Water resources — Use and over utilization of surface and ground water — Floods, drought, conflicts over water, dams — benefits and problems — Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. - Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources: Equitable use of resources for sustainable lifestyles

UNIT-III

Environmental Pollution: Definition, Cause, effects and control measures of different kinds of pollution (Air, Water, Soil, Marine, Noise, Thermal, Nuclear, e —Waste). Carbon Capture & Sequestration — different storage sources, major disadvantages, environmental effects Social Issues and the Environment: From Unsustainable to Sustainable development - Urban problems related to energy -Water conservation, rain water harvesting, and watershed management. -Climate change, global warming, ozone layer depletion, nuclear accidents and holocaust

UNIT-IV

Waste management technology: Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution, Disaster management: floods, earthquake, cyclone and landslides. Waste water and sewage treatment technology: primary, secondary and tertiary treatments. Bioremediation, Phyto-remediation, ZLD (zero liquid discharge), membrane technology. Application of GIS and GPS system in environmental science. Environmental policy, Rules and regulations. EIA (Environmental Impact Assessment) & EMP (ENVIRONMENTAL Management Plan) — Environment Protection Act. - Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act - Wildlife Protection Act —Forest Conservation Act.-Public awareness. Global environmental problems and global efforts

UNIT- V

Towards sustainable future: concept of sustainable development, threats of sustainability, population and its explosion, over exploitation of resources, strategies for

achieving sustainable development. Environmental education, Conservation of resources Urban sprawl, sustainable cities and sustainable communities, human health. Role of IT in environment, environmental ethics, concept of green building, Basic principles of Green engineering, clean development mechanism (CDM), Low carbon life cycle, Polluters-pay principle

Text Books

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha, University Press Private Limited, Reprinted in 2005.
2. Environmental Studies: From Crisis to Cure by R.Rajagopa1an, Oxford University Press, 2nd Edition, 2005

References

1. Environmental Science: Towards a Sustainable Future by Richard T. Wright. PHL Learning Private Ltd .New Delhi, 2008
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P.Ela, PHI Learning Pvt. Ltd. 4th Edition, 2008

DATA WRANGLING AND VISUALIZATION

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54028	PCC	L	T	P	C	CIE	SEE	Total
		2	1	0	3	40	60	100

Course Objectives

1. To introduce the basic concepts of data wrangling using Python
2. To obtain the input data from a variety of sources
3. To extract the data and convert it into representations suitable for data analytics
4. To visualize the data

Course Outcomes

At the end of this course, students will be able to:
1. Use the pandas library
2. Load, store data in different file formats
3. Clean and prepare the data
4 .Plot and Visualize data
6. Do data aggregation

UNIT-I

Getting started with Pandas: Introduction to pandas, Data Structures, Series, Data Frame, Index Objects.

Data Loading, Storage, and File Formats: Reading and Writing Data in Text Format, Reading Text Files in Pieces, Writing Data to Text Format, Working with Delimited Formats, JSON Data.

UNIT-II

Data Loading, Storage, and File Formats: XML and HTML - Web Scraping, Binary Data Formats - Using HDF5 Format, Reading Microsoft Excel Files, Interacting with Web APIs, Interacting with Databases

UNIT-III

Data Cleaning and Preparation: Handling Missing Data, Filtering Out Missing Data, Filling In Missing Data, Data Transformation, Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers, String Manipulation, String Object Methods, Regular Expressions

UNIT-IV

Plotting and Visualization: A Brief matplotlib API Primer, Figures and Subplots, Colors, Markers, and Line Styles, Ticks, Labels, and Legends, Annotations and Drawing on a Subplot, Saving Plots to File, matplotlib Configuration, Plotting with pandas and sea

born, Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots, Facet Grids and Categorical Data, Other Python Visualization Tools, Conclusion.

UNIT-V

Data Aggregation and Group Operations: Group By Mechanics, Iterating Over Groups, Selecting a Column or Subset of Columns, Grouping with Dicts and Series, Grouping with Functions, Grouping by Index Levels, Data Aggregation, Column-Wise and Multiple Function Application, Returning Aggregated Data Without Row Indexes, Pivot Tables and Cross-Tabulation

Text Books

1. Wes McKinney. Python for Data Analysis: Data Wrangling with pandas, NumPy and I Python, O'Reilly, 2017, 2nd Edition
2. Jacqueline Kazil and Katharine Jarmul, Data Wrangling with Python, O'Reilly, 2016

References

1. Data Science Essentials in Python: Collect, Organize, Explore, Predict, Value. Dmitry Zinoriev, The Pragmatic Programmers LLC, 2016
2. Tye Rattenbury, Joseph M. Hellerstein, Jeffrey Heer, Sean Kandel, and Connor Carreras. Principles of Data Wrangling: Practical Techniques for Data Preparation, O'Reilly, 2017
3. Python Data Analytics – Data Analysis and Science using Pandas, matplotlib and the Python Programming Language, Fabio Nelli, Apress, 2015

DESIGN AND ANALYSIS OF ALGORITHMS

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54026	PCC	L	T	P	C	CIE	SEE	Total
		3	1	0	4	40	60	100

Course Objectives

1. Analyze the asymptotic performance of algorithms
2. Apply the Paradigms and approaches to appreciate the impact of algorithm design in practice
3. Synthesize efficient algorithms in common engineering design situations
4. Analyze complex engineering problems using back tracking
5. Utilize data structures and algorithmic design techniques in solving new problems

Course Outcomes

At the end of the course student will be able to:

1. Formulate the knowledge of algorithm analysis and its notations that are applied on the problems solved by divide and conquer paradigm. (L6)
2. Design the major graph algorithms for model engineering problems and knowledge of the greedy paradigm(L6)
3. Apply the dynamic-programming paradigm and recite algorithms that employ this paradigm. (L3)
4. Illustrate the concept of back tracking, branch and bound paradigm for real time problems. (L4)
5. Analyze the complexity of problems and differentiate that in terms of P and NP problems with examples. (L4)

UNIT-I

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big Oh notation, Omega notation, Theta notation and Little oh notation, Disjoint Sets- disjoint set operations, union and find operations.

Divide and conquer: General method, applications - Binary search, Quick sort, Merge sort.

UNIT-II

Graphs: Breadth First Search, Depth First Search, Spanning trees, connected and bi connected components.

Greedy Method: General method, applications - Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT-III

Dynamic Programming: General method, Multi stage graph, applications - Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem.

UNIT- IV

Backtracking: General method, applications - n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT-V

Lower Bound Theory: Comparison trees, NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Clique Decision Problem (CDP), Node cover decision problem.

Text Books

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, Fundamentals of Computer algorithms, Galgotia publications pvt. Ltd, Second Edition, 2007
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivert and Clifford Stein,
3. Introduction to Algorithms, Third Edition, PHI Learning Private Limited, Eastern Economy Edition, 2008

References

1. Aho, Ullman and Hop croft, Design and Analysis of algorithms, Pearson education, Reprint 2002
2. R. C. T. Lee, S. S. Tseng, R. C. Chang and T. T Sai, Introduction to Design and Analysis of Algorithms A strategic approach, McGraw Hill, 2005
3. Allen Weiss, Data structures and Algorithm Analysis in C++, Third edition, Pearson education

FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54029	PCC	L	T	P	C	CIE	SEE	Total
		2	1	0	3	40	60	100

Course Objectives

1. To introduce the basic concepts of artificial intelligence and its foundations
2. To analyse various search strategies in intelligent systems
3. To apply search algorithms in games
4. To learn various representations of logic and knowledge
5. To understand production systems and its components

Course Outcomes

At the end of this course, students will be able to:
1. Understand Strong AI and Weak AI and identify problems applicable to AI
2. Compare and contrast various uninformed and informed search algorithms to find an optimal solution for a given problem
3. Apply appropriate search algorithms for winning games
4. Learn various representations applicable to logic and knowledge useful in reasoning
5. Learn to apply appropriate inference methods in production or expert systems

UNIT-I

Overview of Artificial Intelligence: Introduction. The Turing Test, Strong AI versus Weak AI, Heuristics, Identifying Problems Suitable for AI, Applications and Methods, Early History of AI, Recent History of AIto the Present, AIIn the New Millennium

UNIT-II

Uninformed Search: Introduction: Search in Intelligent Systems, State-Space Graphs, Generate-and-Test Paradigm, Blind Search Algorithms, Implementing and Comparing Blind Search Algorithms. Informed Search**:** Introduction, Heuristics, Informed Search Algorithms–Finding Any Solution, The Best-First Search, The Beam Search, Additional Metrics for Search Algorithms, Informed Search–Finding an Optimal Solution

UNIT-III

Search Using Games: Introduction, Game Trees and Minimax Evaluation, Minimax with Alpha-Beta Pruning, Variations and Improvements to Minimax, Games of Chance and the Expect minimax Algorithm

UNIT-IV

Logic in Artificial Intelligence: Introduction, Logic and Representation, Propositional Logic, Predicate Logic – Introduction, Several Other Logics, Uncertainty and Probability.

Knowledge Representation: Introduction, Graphical Sketches and the Human Window, Graphs and the Bridges of Königs berg Problem, Search Trees, Representational Choices, Production Systems, Object Orientation, Frames, Semantic Networks

UNIT-V

Production Systems: Introduction, Background, Production Systems and Inference Methods, Production Systems and Cellular Automata, Stochastic Processes and Markov Chains, Basic Features and Examples of Expert Systems

Text Books

1. Stephen Lucci, Danny Kopec, Artificial Intelligence in the 21st Century- A Living Introduction, Mercury Learning and Information.2nd Edition.2016

References

1. Russell, Norvig, Artificial Intelligence, A Modern Approach, Pearson Education, Second Edition, 2004
2. Rich, Knight, Nair, Artificial Intelligence, Tata Mcg raw Hill, 3rd edition, 2009
3. Saroj Kaushik, Artificial Intelligence, Cengage Learning, 2011

FUNDAMENTALS OF SOFTWARE ENGINEERING

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54030	PCC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Course Objectives

1. The main objective of this course is to introduce the basics of software engineering and types of software development projects in software industry
2. To learn various Software Life Cycle Models
3. To understand the Software Project Management Processes
4. To learn about the steps or phases of Software Development Process and related artifacts
5. To get exposure to Agile Software Development practices and DevOps

Course Outcomes

At the end of this course, students will be able to:

1. Understand the emergence of software engineering and types of software development projects
2. Assess merits and demerits of software life cycle models and selecting appropriate model for a project
3. Learn the software project management practices and techniques essential for successful completion of a project
4. Learn the steps or phases involved in software development processes and its related artifacts
5. Learn about Agile Software Development practices and DevOps

UNIT- I

Introduction: Evolution from an Art Form to an Engineering Discipline, Software Development Projects Emergence of Software Engineering: Notable Changes in Software Development Practices, Computer Systems Engineering

UNIT-II

Software Life Cycle Models: A Few Basic Concepts, Waterfall Model and its Extensions – (Iterative, V Model, Prototyping, Incremental, Evolutionary Model), Rapid Application Development (RAD), Spiral Mode, Comparison of Different Life Cycle Models and Selecting an Appropriate Life cycle Model for a Project

UNIT-III

Software Project Management: Software Project Management Complexities. Responsibilities of a Software Project Manager, Project Planning, Metrics for Project

Size Estimation; Project Estimation Techniques: Introduction to COCOMO—A Heuristic Estimation Technique. Introduction to Halstead's Software Science—An Analytical Technique; Scheduling - Critical Path Method (CPM).PERT Charts. Gantt Charts; Risk Management, Software Configuration Management

UNIT– IV

Phases of Software Development Processes, Requirements Analysis and Specification phase– Software Requirements Specification (SRS) Document, Functional requirements and Non Functional Requirements, Software Design phase – Cohesion and Coupling, Function Oriented Design (Data Flow Diagrams) and Object Oriented Design (Object Modelling using UML), Coding phase - Coding Standards and Guidelines. Code Review, .Software Documentation, Debugging, Testing Phase - Design Test Cases, Black-box Testing, White-Box Testing, Integration Testing, Smoke Testing, and Deployment Phase – Deployment Diagram, and Software Maintenance

UNIT–V

Roles and Responsibilities – Business owner, Product Manager, Designers, Backend, Frontend, Quality Assurance, DevOps. Agile Development Methodologies- The agile philosophy, agile process models, agile project management, SCRUM, SPRINT

Text Books

1. Rajib Mall (2014), Fundamentals of Software Engineering, PHI Learning
2. Olga Filipova, Rui Vilao (2018) Software Development from A to Z_ A Deep Dive In to all the Roles Involved in the Creation of Software

References

1. Pressman, R. S., Software Engineering: A Practitioner's Approach, Tata Mc Graw Hill,2009
2. Jalote, P (2005), An Integrated Approach to Software Engineering, Narosa Publishing House
3. Mc Connell, S., (2014), Code Complete: A Practical Handbook of Software Construction (2nd Ed.), Microsoft Press
4. Ahmed, A., (2011), Software Project Management: A Process-Driven Approach, Auerbach Publications 6. Beck, K., (2002), Test Driven Development: By Example, Addison-Wesley Professional
5. Williams, L. & Kessler, R., (2002), Pair Programming Illuminated, Addison-Wesley Professional

DATABASE MANGEMENT SYSTEMS

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54027	PCC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Course Objectives

1. Discuss Database management systems, databases and its applications
2. Familiarize the students with a good formal foundation on the relational model.
3. Outline the various systematic database design approaches
4. Describe the concepts of transactions and transaction processing and the issues, techniques related to concurrency and recovery manager.
5. Explore the File organizations, indexing and hashing mechanisms.

Course Outcomes

After completion of the course student will be able to:

1. Model Entity-Relationship diagrams for enterprise level databases [L3]
2. Formulate Queries using SQL and Relational Formal Query Languages [L3]
3. Apply different normal forms to design the Database [L3]
4. Summarize concurrency control protocols and recovery algorithms [L5]
5. Identify suitable Indices and Hashing mechanisms for effective storage and retrieval of Data [L3]

UNIT-I

Introduction to Database System Concepts: Database-System Applications, Purpose of Database Systems, View of Data, Database Language, Database Design, Database Architecture, Database Users and Administrators.

Introduction to the Relation Models and Database Design using ER Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations Overview of the Design Process, The Entity-Relationship Model, Constraints, Entity-Relationship Diagrams- Unary, Binary, ternary, Aggregation.

UNIT-II

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Aggregate Functions, Nested Sub queries.

Formal Relational Query Languages: The Relational Algebra, Tuple Relational Calculus.

UNIT-III

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Functional Dependencies, Closure set of Functional dependencies, Procedure for Computing F+, Boyce Codd Normal form, BCNF Decomposition Algorithm, Third Normal Form, Third Normal Form Decomposition Algorithm

Transactions: Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Serializability.

UNIT-IV

Concurrency Control: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols.

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, ARIES, Remote Backup Systems.

UNIT-V

File Organization: Fixed and variable length records, Sequential file organization, Data Dictionary, Buffer manager.

Indexing and Hashing: Basic Concepts, Ordered Indices, B+-Tree Index Files, B+-Tree Extensions, Multiple-Key Access, Static Hashing, Extendible Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices.

Text Book

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Sixth Edition, Tata McGraw-Hill 2006

References

1. Raghu Rama Kirshna, Johannes Gchrke, Database Management System, Third Edition, TATA MC Graw Hill, 2003
2. C J Date, AKannan, S Swamynathan, An Introduction to Database Systems, Eighth Edition Pearson 2006
3. P Raja Sekhar Reddy, A Mallikarjuna Reddy,Foundations of Database Management Systems,Lambert Academic Publishing, 2020 (e-Book)
4. https://www.pdfdrive.com/fundamentals-of-database-systems-pdf-e51477130.html

SOFT SKILLS FOR SUCCESS LAB

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54217	HSS & MC Lab	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

Introduction

The primary focus of the course is to highlight various categories and applications of Soft Skills through various cases taken from the real field and other research case studies. The fundamental concepts and distinctions between Soft Skills and Hard Skills are discussed. The course is tailored very effectively to introduce various Soft Skill application examples

Objectives

To identify and participate in meaningful conversations

Course Outcomes:

After completion of the course student will be able to:

1. Exhibit communication skills in various situations
2. Handle the emotions with peers and classmates
3. Demonstrate respect for the opinions, personal space, and beliefs of others
4. Connect and work with others to achieve a set task
5. Assess and identify the requirements and strengths within the team

UNIT-I

Soft Skills Development: An Introductory Overview - Self-Discovery & Goal Setting - Johari Window

UNIT-II

Personality Development - Body Language - Etiquette & Manners

UNIT-III

Presentation Skills (Individual & Team) Oral & Written - Teamwork & Leadership Qualities

UNIT-IV

Debates - Group Dynamics - Dos & Don’ts - Techniques to Participate and Conclude

UNIT-V

Emotional Intelligence - Conflict Management - Stress Management

Minimum requirements of infrastructural facilities for “Soft Skills for Success”

Laboratory:

A spacious room with movable chairs, a Public Address System, and a Digital Stereo-Audio & Video system

References

1. Soft Skills for Everyone by Butterfield, Jeff. New Delhi: Cengage Learning. 2010
2. Soft Skills by Chauhan, G.S. &Sangeeta Sharma. New Delhi: Wiley. 2016
3. Working with Emotional Intelligence by Goleman, Daniel. London: Banton Books, 1998
4. Theories of Personality by Hall, Calvin S. et al. New Delhi: Wiley. 2011
5. Corporate Conversations by Holtz, Shel. New Delhi: PHI. 2007

DATA WRANGLING AND VISUALIZATION LAB

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54218	PCC-Lab	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

Objective:

The main objective of this laboratory is to put into practice the ETL (extract, transform, load) pipeline which will extract raw data, clean the data, perform transformations on data, load data and visualize the data. Case Studies may be provided from industry to understand the real world scenarios

Datasets

For this laboratory, appropriate publicly available datasets, can be studied and used.
Example:
MNIST (http://yann.lecun.com/exdb/mnist/),
UCI Machine Learning Repository(https://archive.ics.uci.edu/ml/datasets.html),
Kaggle(https://www.kaggle.com/datasets)
Twitter Data

Exercises

1. Write programs to use the panda's data structures: Frames and series as storage containers and for a variety of data-wrangling operations
2. Write programs to parse text files, CSV, HTML, XML and JSON documents and extract relevant data. After retrieving data check any anomalies in the data, missing values etc.
3. Write programs for reading and writing binary files
4. Write programs for searching, splitting, and replacing strings based on pattern matching using regular expressions
5. Design a relational database for a small application and populate the database. Using SQL do the CRUD (create, read, update and delete) operations.
6. Create a Python MongoDB client using the Python module pymongo. Using a collection object practice functions for inserting, searching, removing, updating, replacing, and aggregating documents, as well as for creating indexes
7. Use matplotlib and draw plots using the datasets

8. Write programs to Split a panda's object into pieces using one or more keys (in the form of functions, arrays, or Data Frame column names), calculate group summary statistics, like count, mean, or standard deviation, or a user-defined function, Compute pivot tables and cross-tabulations

DATABASE MANGEMENT SYSTEMS LAB

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54219	PCC-Lab	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

Course Objectives

1. To provide a sound understanding of DDL, DML, DCL and TCL
2. To write the queries for the schemas
3. To introduce PL/SQL Programming

Course Outcomes

After completion of the course student will be able to:
1. Use the SQL commands such as DDL, DML, DCL, TCL to create, manipulate, access data from database objects and providing authorization to access database by different users (L3)
2. Apply various integrity Constraints on the database tables for preserving the integrity of the database(L3)
3. Develop PL/SQL programs which include procedures, functions, cursor and triggers (L3)

Week 1

Data Base user creation**,** Data definition Language commands, Data Manipulation commands, Data Control Language Commands, Transaction Control Language commands

Week 2

Database Schema for a customer-sale scenario
Customer (Cust id : integer, cust_name: string)
Item (item_id: integer,item_name: string, price: integer)
Sale (bill_no: integer, bill_data: date, cust_id: integer, item_id: integer, qty_sold: integer)

For the above schema, perform the following—
1. Create the tables with the appropriate integrity constraints
2. Insert around 10 records in each of the tables
3. List all the bills for the current date with the customer names and item numbers
4. List the total Bill details with the quantity sold, price of the item and the final amount
5. List the details of the customer who have bought a product which has a price>200
6. Give a count of how many products have been bought by each customer
7. Give a list of products bought by a customer having cust_id as 5
8. List the item details which are sold as of today

9. Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount
10. Create a view which lists the daily sales date wise for the last one week

Week 3

Database Schema for a Student Library scenario
Student (Stud_no : integer,Stud_name: string)
Membership (Mem_no: integer,Stud_no: integer)
Book (book_no: integer, book_name:string, author: string)
Iss_rec(iss_no:integer, iss_date: date, Mem_no: integer, book_no: integer)
For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the student names with their membership numbers
d) List all the issues for the current date with student and Book names
e) List the details of students who borrowed book whose author is CJDATE
f) Give a count of how many books have been bought by each student
g) Give a list of books taken by student with stud_no as 5
h) List the book details which are issued as of today
i) Create a view which lists out the iss_no, iss _date, stud_name, book name
j) Create a view which lists the daily issues-date wise for the last one week

Week 4

Database Schema for a Employee-pay scenario
employee (emp_id : integer,emp_name: string)
department (dept_id: integer,dept_name:string)
paydetails(emp_id : integer,dept_id: integer, basic: integer, deductions: integer, additions: integer, DOJ: date)
payroll (emp_id : integer, pay_date: date)

For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List the employee details department wise
d) List all the employee names who joined after particular date
e) List the details of employees whose basic salary is between 10,000 and 20,000
f) Give a count of how many employees are working in each department
g) Give a name of the employees whose netsalary>10,000
h) List the details for an employee_id=5
i) Create a view which lists out the emp_name, department, basic, deductions, netsalary
j) Create a view which lists the emp_name and his netsalary

Week 5

Database Schema for a Video Library scenario
Customer (cust_no: integer,cust_name: string)
Membership (Mem_no: integer, cust_no: integer)
Cassette (cass_no:integer, cass_name:string, Language: String)
Iss_rec(iss_no: integer, iss_date: date, mem_no: integer, cass_no: integer)
For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the customer names with their membership numbers
d) List all the issues for the current date with the customer names and cassette names
e) List the details of the customer who has borrowed the cassette whose title is " The Legend"
f) Give a count of how many cassettes have been borrowed by each customer
g) Give a list of books which has been taken by the student with mem_no as 5
h) List the cassettes issues for today
i) Create a view which lists outs the iss_no, iss_date, cust_name, cass_name
j) Create a view which lists issues-date wise for the last one week

Week 6

Database Schema for a student-Lab scenario
Student (stud_no: integer, stud_name: string, class: string)
Class (classno: string,descrip: string)
Lab (mach_no: integer, Lab_no: integer, description: String)
Allotment (Stud_no: Integer, mach_no: integer, dayof week: string)
For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the machine allotments with the student names, lab and machine numbers
d) List the total number of lab allotments day wise
e) Give a count of how many machines have been allocated to the 'CSIT' class
f) Give a machine allotment details of the stud_no 5 with his personal and class details
g) Count for how many machines have been allocatedinLab_no1 for the day of the week as "Monday"
h) How many students class wise have allocated machines in the labs
i) Create a view which lists out the stud_no, stud_name, mach_no, lab_no, day of week
j) Create a view which lists the machine allotment details for "Thursday"

Week 7

Write a program to find largest number from the given three numbers.
Simple programs using loop, while and for iterative control statement.
Write a program to check whether the given number is Armstrong or not
Write a program to generate all prime numbers below 100

Week 8

Write a program to demonstrate the GOTO statement.
Write a program to demonstrate %type and %row type attributes

Week 9

Write a program to demonstrate predefined exceptions
Write a program to demonstrate user defined exceptions
Create a cursor, which displays all employee numbers and names from the EMP table

Week 10

Create a cursor, which update the salaries of all employees who works in deptno 10.
Create a cursor, which displays names of employees having salary > 50000

Week 11

Create a procedure to find reverse of a given number
Create a procedure to update the salaries of all employees whose salary is between 25000 to 50000

Week 12

Create a procedure to demonstrate IN, OUT and INOUT parameters
Create a function to check whether given string is palindrome or not

Week 13

Create a function to find sum of salaries of all employees working in depart number 10.
Create a trigger before/after update on employee table for each row/statement

Week 14

Create a trigger before/after delete on employee table for each row/statemen.
Create a trigger before/after insert on employee table for each row/statement

Week 15

Overview

Text Book

1.Ivan Bay ross, SQL, PL/SQLThe programming Language of Oracle , Fourth Revised Edition, BPB Publications

GENDER SENSITIZATION

BTech (AI) II Year II Semester					Dept. of Artificial Intelligence			
Code	Category	Hours / Week			Credits	Marks		
A54022	MC	L	T	P	C	CIE	SEE	Total
		2	0	0	0	--	--	--

Course Objectives

1. To develop students sensibility with regard to issues of gender in contemporary India
2. To provide a critical perspective on the socialization of men and women
3. To introduce students to information about some key biological aspects of genders
4. To expose the students to debates on the politics and economics of work
5. To help students reflect critically on gender violence
6. To expose students to more egalitarian interactions between men and women

Course Outcomes

After completion of the course student will be able to:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Student will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of laborand its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks oflife.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence

UNIT-I

Understanding Gender: Gender: Why Should We Study It? (Towards a World of Equals: Unit-1) Socialization: Making Women Making Men (Towards a World of Equals: Unit-2), Introduction. Preparing for Woman hood. Growing up Male First

lesions in Caste. Different Masculinities .Just Relationships: Being Together as Equals (Towards a World of Equals: Unit-12) MaryKorn and Onler. Love and Acid just do not Mix. Love Letters. Others and Fathers. Further Reading: Rosa Parks-The Brave Heart

UNIT-II

Gender and Biology: Missing Women: Sex Selection and Its Consequences, (Towards a World of Equals: Unit-4) Declining Sex Ratio. Demographic, Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit-lO)Two or Many? Struggles with Discrimination Additional Reading: Our Bodies, Our Health (Towards a World of Equals: Unit-13)

UNIT-III

Gender and Labour: Housework: the Invisible Labour(Towards a World of Equals: Unit t-3)"My Mother doesn't Work." "Share the Load. "Women's Work: Its Politics and Economics (Towards a World of Equals; Unit-7) Fact and Fiction. Unrecognized and Unaccounted work .Further Reading: Wages and Conditions of Work

UNIT-IV

Issues of Violence: Sexual Harassment: Say No! (Towards a World of Equals: Unit-6)Sexual Harassment not Eve-Teasing- Coping with Everyday Harassment-Further Reading: "Chupulu" .Domestic Violence: Speaking Out (Towards a World of Equals: Unit-8) Is Home a Safe Place? When Women Unite (Film).Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about Sexual Violence (Towards a World of Equals: Unit-ll) Blaming the Victim-"! Fought for my Life " - Further Reading: The Caste Face of Violence

UNIT-V

Gender Studies: Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit-5), Point of View. Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists of Telangana. Whose History? Questions for Historians and Others (Towards a World of Equals Reclaiming a Past Writing other Histories. Further Reading: Missing Pages from Modern Telangana History. Essential Reading: All the Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagarj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field

References

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2. K. Satyanarayana & Susie Tharu (ed.) Steel are sprouting: New Dalit Writing from South India, Dossier 2: Telugu and Kannada http://herpercollins.co.in/Bookdetail.asp? Book _code = 3732.
3. Monon, Nivedita, Seeing like a Feminist, New Delhi: Zubaan-Penguin Bokks, 2012.
4. Virginia Woolf: A Room of One’s Own. Oxford: Black swan. 1992.