

B. Tech Computer Science and Engineering (Artificial Intelligence and Machine Learning)
Scheme of Studies/Examination
Semester III

S. No.	Course No.	Subject	L:T:P	Hours/Week	Credits	Examination Schedule				Duration of Exam (Hrs.)
						Major Test	Minor Test	Practical	Total	
1	BS- CS- AIML- 201A	Applied Statistical Analysis for AI	3:0:0	3	3	75	25	0	100	3
2	ES- CS- AIML- 203A	Data Structure	3:0:0	3	3	75	25	0	100	3
3	PC- CS- AIML- 205A	Object Oriented Programming	3:0:0	3	3	75	25	0	100	3
4	PC- CS- AIML- 207A	Introduction to AI	3:0:0	3	3	75	25	0	100	3
5	ES- CS- AIML- 209A	Programing Language	3:0:0	3	3	75	25	0	100	3
6	HM-902A	Business Intelligence and Entrepreneurship	3:0:0	3	3	75	25	0	100	3
7	PC- CS- AIML- 213LA	Data Structure Lab	0:0:2	2	1	0	40	60	100	3
8	PC- CS- AIML- 215LA	Object Oriented Programming Lab	0:0:2	2	1	0	40	60	100	3
9	PC- CS- AIML- 217LA	Python –Lab-I	0:0:2	2	1	0	40	60	100	3
		Total		24	21	450	270	180	900	
11	SIM-201A*	Seminar on Summer Internship	2:0:0	2	0	0	50	0	50	



JMIETI, RADAUR

Lesson Plan of **Applied Statistical Analysis for AI (BS-CS-AIML-201A)**
Department-CSE, Semester 3rd, w.e.f 29.8.22

Name of Teacher : Vinay Gaur
Designation : Assistant Professor
Subject with code : **Applied Statistical Analysis for AI (BS-CS-AIML-201A)**

Lecture	Class	Topic/Chapter Covered	Academic Activity	Test/ Assignment
L1	B.Tech 3 rd sem	Introduction, Meaning of Statistics	Lecture	Assignment from 1 st Unit Tutorial sheet1 (based on previous question papers and important topics)
L2	B.Tech 3 rd sem	The Scientific Method	Lecture	
L3	B.Tech 3 rd sem	Basic Steps of the Research Process	Lecture	
L4	B.Tech 3 rd sem	Experimental Data and Survey Data	Lecture	
L5	B.Tech 3 rd sem	Populations and Samples, Census and Sampling Method	Lecture	
L6	B.Tech 3 rd sem	Parameter and Statistic	Lecture	
L7	B.Tech 3 rd sem	Independent and Dependent Variables, Examining Relationships	Lecture	
L8	B.Tech 3 rd sem	Introduction to SPSS Statistics.	Lecture	
L9	B.Tech 3 rd sem	Introduction, Types of Data	Lecture	
L10	B.Tech 3 rd sem	Data Transformation, Summarizing Data	Lecture	
L11	B.Tech 8 th sem	Graphical Methods, Summarizing Data	Lecture	Assignment from 2 nd Unit Tutorial sheet1 (based on previous question papers and important topics)
L12	B.Tech 8 th sem	Measures of Central Tendency, Summarizing Data	Lecture	
L13	B.Tech 8 th sem	Measures of Dispersion	Lecture	
L14	B.Tech 8 th sem	Levels of Measurement	Lecture	
L15	B.Tech 8 th sem	Random Variables and Probability Distributions	Lecture	
L16	B.Tech 8 th sem	Discrete and Continuous Random Variable	Lecture	
L17	B.Tech 8 th sem	Making Inferences about Populations from samples	Lecture	
L18	B.Tech 3 rd sem	L-17 continued	Lecture	Assignment from 3 rd Unit Tutorial sheet1 (based on previous question papers and important topics)
L19	B.Tech 3 rd sem	Estimator and Estimate	Lecture	
L20	B.Tech 3 rd sem	Confidence Interval for Population Mean (Large Sample)	Lecture	
L21	B.Tech 3 rd sem	Introduction, Null and Alternative Hypothesis	Lecture	
L22	B.Tech 3 rd sem	Type I and Type II Error	Lecture	
L23	B.Tech 3 rd sem	The Procedure of Hypothesis Testing	Lecture	
L24	B.Tech 3 rd sem	Hypothesis Testing of a Population Mean	Lecture	
L25	B.Tech 3 rd sem	Sample, a propotion(One Sample)	Lecture	
L26	B.Tech 3 rd sem	Population Variance	Lecture	
L27	B.Tech 3 rd sem	Population Mean	Lecture	
L28	B.Tech 3 rd sem	Two Independent Samples(), Dependent Samples (Paired Samples),	Lecture	
L29	B.Tech 3 rd sem	Two Population Proportion	Lecture	

L30	B.Tech 3 rd sem	Two Population Variances	Lecture	Assignment from 4 th Unit Tutorial sheet 1 (based on previous question papers and important topics)
L31	B.Tech 3 rd sem	Analysis of Variance (ANOVA)	Lecture	
L32	B.Tech 3 rd sem	Introduction, Types of Correlation	Lecture	
L33	B.Tech 3 rd sem	Karl Pearson Coefficient Correlation	Lecture	
L34	B.Tech 3 rd sem	Spearman's Rank Order Correlation	Lecture	
L35	B.Tech 3 rd sem	Partial Correlation	Lecture	
L36	B.Tech 3 rd sem	Residuals and Plots	Lecture	
L37	B.Tech 3 rd sem	Simple Linear Regression	Lecture	
L38	B.Tech 3 rd sem	Multiple Regression Model, Repeated Measures	Lecture	
L39	B.Tech 3 rd sem	Non-linear Regression	Lecture	
L40	B.Tech 3 rd sem	Polynomial Regression Models	Lecture	3 rd Sessional
L41	B.Tech 3 rd sem	Decision Trees, Neural Networks	Lecture	
L42	B.Tech 3 rd sem	Cluster Analysis, Factor Analysis	Lecture	

Course Outcomes (CO)

- 1) To study the Statistical Analysis concepts with their relationships and process
- 2) To familiarize with describing data, transforming and summarizing
- 3) To understand testing hypothesis with real time applications
- 4) To apply the examining relationships to find the correlation and regression
- 5) To demonstrate and analyse using basic statistical techniques with different use cases
- 6) To understand the advanced techniques with applications of decision trees, neural networks



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Lesson Planning of Data Structures and Algorithms

Deptt. .

CSE-AIML Semester 3rd w.e.f. . . 29.08.2022

Name of Teacher : Mr. Tajenderkumar

Designation : Assistant Professor

Subject with code : **ES-CS-AIML-203A**

Objective of Course: 1. To introduce the principles and paradigms of Data Structures for design and implement the software systems logically and physically.

Lecture	Topic/Chapter Covered	Academic Activity	Test/Assignment
L1	Data Types, Built-in and User Defined Data Structures	LECTURE	
L2	Applications of Data structure, Algorithm Analysis, Worst,	LECTURE	
L3	Best and Average Case Analysis	LECTURE	
L4	Notations of Space and Time Complexity Basics of Recursion	LECTURE	
L5	One Dimensional Arrays, Two Dimensional Arrays and Multi-Dimensional Arrays	LECTURE	
L6	Sparse matrices,	LECTURE	
L7	Searching from array using Linear and Binary Searching Algorithm	LECTURE	Test
L8	Sorting of array using Selection	LECTURE	
L9	Insertion Sort	LECTURE	
L10	Bubblesort	LECTURE	Test
L11	Radix Algorithm	LECTURE	
L12	Definition, Implementation of Stacks and its operations,	LECTURE	
L13	Evaluation of Infix	LECTURE	
L14	Prefix expression inter conversion of infix,	LECTURE	
L15	Postfix expression inter conversion of infix	LECTURE	Assignment
L16	prefix and post-fix expression	LECTURE	
L17	Implementation of Merge sort	LECTURE	
L18	quicksort Algorithm	LECTURE	
L19	Definition, Sequential implementation of linear Queue and its operations,	LECTURE	

L 20	CircularQueueandits Implementation	LECTURE	
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L 21	PriorityQueues and its Implementation	LECTURE	Assignment
L 22	Applicationofqueues ,needof dynamicDatastructures	LECTURE	
L23	singlelinklistand	LECTURE	Test
L24	Itsdynamicimplementation, traversinginsertion,	LECTURE	
L25	deletionoperationsonsinglelink list	LECTURE	
L 26	Comparisonbetweenstaticanddynamic,implementationof linkedlist	LECTURE	
L 27	Circularlinklist	LECTURE	
L 28	doublylink list ,dynamic implementationofprimitive	LECTURE	
L29	Operationson Doublylinkedlists andcircularlink list,	LECTURE	
L30	Dynamicimplementationof Stacks	LECTURE	
L31	Dynamicimplementationof Queues	LECTURE	Assignment
L32	Definition , Basic terminology,Binarytree,external andinternal Nodes	LECTURE	
L33	Staticanddynamic implementation of abinarytree	LECTURE	
L34	Staticanddynamic implementation of abinarytree	LECTURE	
	primitiveoperation on Binary tree	LECTURE	
L35	Primitivesoperationofbinary trees,	LECTURE	Test
L36	binarytreetraversals pre-order,	LECTURE	
L37	In-order andpostorder traversals,	LECTURE	
L38	Representationofinfix,postfix andprefix expressionusingtrees	LECTURE	
L39	Introductiontobinarysearch treesB+trees,	LECTURE	
L40	ThreadedBinarytrees,balanced multiwaysearchtrees,	LECTURE	
L41	Implementationofheapsort Algorithm	LECTURE	Assignment
L42	BasicTerminolgy,Definition of undirectedanddirected Graphs,	LECTURE	
L43	MemoryRepresentation of Graphs,minimumspanningtrees,w arshalgorithm	LECTURE	
L44	Graphtraversalsalgorithms, Breadthfirstanddepthfirst	LECTURE	

Outcome of Course: 1. Understand and determine the usage of primitive data structures.

2. Implement and analyze real-life applications of various data structures such as array
3. To study concept of binary tree, BST, AVL trees, Btree and their implementation.
4. To study graph traversal techniques and spanning techniques
5. To teach the concept of protection and management of data.
6. To improve the logical ability.

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Lesson Planning of Object Oriented Programming Deptt. . CSE-AIML Semester 3rd w.e.f...29.08.2022

Name of Teacher : Dr. Vivek Sharma

Designation : Director & Associate Professor

Subject with code : **PC-CS-AIML-205A**

Objective of Course: 1. To introduce the principles and paradigms of Object Oriented Programming Language for design and implement the Object Oriented System.
2. To build up logic capabilities

Lecture	Topic/Chapter Covered	Academic Activity	Test/Assignment
L1	Introduction to C++, C++ standard Library, Illustrative simple C++ Programs	LECTURE	
L2	Header files, Namespaces,	LECTURE	
L3	Application of object oriented programming	LECTURE	
L4	Object oriented concepts,	LECTURE	
L5	Introduction to objects and object oriented Programming	LECTURE	
L6	Introduction to objects and object oriented Programming	LECTURE	
L7	Encapsulation,	LECTURE	
L8	Polymorphism	LECTURE	
L9	Overloading,	LECTURE	
L10	Inheritance,	LECTURE	
L11	Abstract Classes	LECTURE	Assignment
L12	Access specifier (public/protected/private,) Class scope and accessing class member	LECTURE	
L13	Controlling access function, constant	LECTURE	
L14	class member	LECTURE	
L15	structure and class	LECTURE	
L16	Friends function and	LECTURE	
L17	friend classes	LECTURE	
L18	this pointer	LECTURE	
L19	Dynamic Memory Allocation and De-allocation (New and Delete)	LECTURE	
L20	Static Class members,	LECTURE	
L21	Constructors,	LECTURE	
L22	parameter Constructors,	LECTURE	
L23	copy constructors	LECTURE	
L24	Destructors	LECTURE	
L25	Introduction of inheritance,	LECTURE	

L 26	TypesofInheritance,	LECTURE	
L 27	TypesofInheritance	LECTURE	
L 28	Public,ProtectedandPrivateInheritance,	LECTURE	
L29	EffectofconstructorsandDestructorsof BaseClassinDerivedClasses	LECTURE	Assignment
L30	Polymorphism,PointertoDerivedClass,	LECTURE	
L31	VirtualFunctionsPureVirtualFunction	LECTURE	
L32	Abstract BaseClasses,StaticandDynamic Binding,	LECTURE	
L33	VirtualDestructors	LECTURE	
L34	Fundamentalsof OperatorOverloading,rule forOperatorsOverloading	LECTURE	
	ImplementationofOperatorOverloadingL ike <<>>UnaryOperators, Binary Operators	LECTURE	
L35	Textstreams andbinarystream,	LECTURE	
L36	SequentialandRandomaccessfile	LECTURE	
L37	Streaminput/Outputclasses,stream manipulators.	LECTURE	
L38	BasicsofC++ExceptisonHanding	LECTURE	Assignment
L39	Try, Throw,Catch, Multiple Catch	LECTURE	
L40	Re-throwingan exception,Exception Specifications	LECTURE	
L41	Templates:FunctionTemplates,	LECTURE	
L42	OverloadingTemplateFunction	LECTURE	
L43	ClassTemplate,ClassTemplates	LECTURE	
L44	Non–typetemplatearguments	LECTURE	

Outcomeof Course:

1. Tounderstand thedifferencesbetweenproceduraldesignand object-orienteddesign
2. TounderstandtheConceptofinheritance,polymorphism,dynamicbindingandGenericstructures
3. Object-orientedprogramdesignbasedontemplatemodelofC++.
4. forcreatingefficientcodes,exceptionhandlingMechanisms useinC++
5. Performobjectorientedprogrammingtodevelop solutionstoproblemsdemonstratingusageofcontrolstructures,modularity, I/O.and otherstandardlanguageconstructs.
6. Tolearnhowto designC++classesforcodereuse.

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Lesson Planning of Principles for Introduction to AI
CSE-AIML Semester 3rd w.e.f...29.08.2022

Deptt.

Name of Teacher : Dr. Vishal Garg Designation

: Assistant Professor & Head S

Subject with code : PC- CS- AIML- 207A

Objective of Course:

1. To introduce the principles and paradigms of programming languages for design and implement the software intensive systems.

Lecture	Topic/Chapter Covered	Academic Activity	Test/Assignment
L1	Introduction to Artificial Intelligence	LECTURE	
L2	History of Artificial Intelligence	LECTURE	
L3	Artificial Intelligence Languages	LECTURE	
L4	Multi Agent Systems	LECTURE	
L5	natural language processing	LECTURE	
L6	vision and speech processing	LECTURE	
L7	Robotics	LECTURE	
L8	expert systems	LECTURE	
L9	expert systems	LECTURE	
L10	Case study: Google Duplex, Dialogflow.	LECTURE	
L11	Problem spaces and search	LECTURE	Assignment
L12	Heuristic and Informed search strategies	LECTURE	
L13	Minimax search	LECTURE	
L14	Alpha-beta pruning	LECTURE	
L 15	Search and optimization (gradient descent)	LECTURE	
L 16	Adversarial search	LECTURE	
L17	Planning and scheduling	LECTURE	
	Case study: Health Care System.	LECTURE	

L 18			
L 19	Knowledge and Knowledge based system	LECTURE	
L 20	Knowledge and rationality	LECTURE	
L 21	Logic and inference	LECTURE	
L 22	Propositional and predicate logic	LECTURE	
L23	Propositional and predicate logic	LECTURE	
L24	Ontologies, Bayesian Reasoning,	LECTURE	
L25	Temporal reasoning,	LECTURE	
L 26	Case study: Medical diagnosis	LECTURE	
L 27	Case study: Medical diagnosis	LECTURE	
L 28	Knowledge Discovery: Data and Web Mining	LECTURE	
L29	Knowledge Discovery: Data and Web Mining	LECTURE	
L30	AI in Marketing	LECTURE	
L31	AI in Banking	LECTURE	
L32	AI in Finance	LECTURE	
L33	AI in Agriculture	LECTURE	
L34	AI in Health Care	LECTURE	
	AI in Gaming	LECTURE	
L35	AI in Space Exploration	LECTURE	
L36	AI in Autonomous vehicles,	LECTURE	
L37	AI in Chatbots	LECTURE	
L38	AI in Chatbots	LECTURE	Assignment
L39	AI in Creativity	LECTURE	

Outcome of Course:

- To study the Statistical Analysis concepts with their relationships and process.
- To familiarize with describing data, transforming and summarizing.
- To understand testing hypothesis with real time applications.
- To apply the examining relationships to find the correlation and regression.
- To demonstrate and analyse using basic statistical techniques with different use cases.
- To understand the advanced techniques with applications of decision trees, neural networks.

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Lesson Planning of Principles for Programming Languages
AIML Semester 3rd w.e.f. . . 29.08.2022

Deptt. CSE-

Name of Teacher : Ms.

Upasana Sood Designation

: Assistant Professor & Head S

Subject with code : **ES-CS-AIML-209A**

Objective of Course:

1. To introduce the principles and paradigms of programming languages for design and implement the software intensive systems.

Lecture	Topic/Chapter Covered	Academic Activity	Test/Assignment
L1	A brief History, Characteristics of good programming language	LECTURE	
L2	Programming Language translators compiler and interpreters,	LECTURE	
L3	Elementary data types – data objects, variable and constants, datatypes.	LECTURE	
L4	Specification and implementation of elementary datatypes, Declarations,	LECTURE	
L5	Type checking and type conversions, assignment and Initialization	LECTURE	Assignment
L6	Numeric Datatypes, enumerations, Booleans and characters	LECTURE	
L7	Syntax and semantics: introduction, general problem of describing syntax,	LECTURE	
L8	Formal method of describing syntax, attribute grammar dynamic semantic	LECTURE	Test/Assignment

L9	Structured data objects and datatypes, specification and implementation of structured data Types	LECTURE	
L10	Declaration and type checking of data structured, vector and arrays,	LECTURE	Test
L11	Records character strings, variable sized data structures, Union,	LECTURE	
L12	pointer and programmer defined	LECTURE	

	dataobjects		
L13	Sets	LECTURE	
L14	Files	LECTURE	Assignment
L 15	Evolutionofdatatypeconcept abstraction,	LECTURE	
L 16	encapsulationandinformation hiding,	LECTURE	
L17	Subprograms,typedefinition, abstractdatatypes	LECTURE	
L 18			
L 19	overloadedsubprograms,generic subprograms,	LECTURE	Test
L 20	Implicitandexplicitsequence Control	LECTURE	
L 21	sequencecontrolwithin expression,	LECTURE	
L 22	Sequencecontrolwithin statement,	LECTURE	Assignment
L23	subprogramsequence control	LECTURE	
L24	simplecallreturn,	LECTURE	
L25	Recursivesubprograms,,coo Routines	LECTURE	
L 26	exceptionandexceptionhandlers	LECTURE	
L 27	Sequencecontrol.,	LECTURE	
L 28	Concurrencysubprogramlevel Concurrency	LECTURE	Test
L29	synchronizationthrough semaphores	LECTURE	
L30	monitorsand messagepassing	LECTURE	
L31	DatacontrolNamesand referencingenvironment	LECTURE	
L32	staticanddynamicsscope	LECTURE	
L33	Blockstructure,	LECTURE	
L34	shareddata	LECTURE	
	localdataandlocal referencing environment	LECTURE	
L35	Dynamicandstaticscope	LECTURE	
L36	parameterandparameter transmissionschemes	LECTURE	Test
L37		LECTURE	
L38	Majorruntimeelements requiringstorage,	LECTURE	
L39	programmer and systemcontrolledstoragemanag ement andphases,	LECTURE	
L 40	Staticstoragemanagement,	LECTURE	
L 41	stackbasedstoragemanagement	LECTURE	
L 42	Heapstoragemanagement,	LECTURE	Assignment
L43	Introductiontoprocedural,	LECTURE	
L44	nonproceduralstructured, Logical,functionaland object orientedprogramminglanguage	LECTURE	

L45	Comparison of C and C++ programming languages,	LECTURE	
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Outcome of Course:

1. Understand the Fundamental concept of different programming languages.
2. Enhance the skill to Design a new programming language.
3. Outline the prerequisites for creating a new programming language.
4. To introduce the concepts
of storage management using programming languages.
5. To outline the sequence control and data control Develop an understanding
of the compilation process

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**Lesson Planning of Business Intelligence & Entrepreneurship, Deptt. .
CSE-AIML Semester 3rdw.e.f...29.08.2022**

Name of Teacher : Ms.

Medha Designation : Assistant

Prof. Subject with code : HM-902A

Objective of Course:

1. Students will be able to understand who the entrepreneurs are and what competences needed to become an Entrepreneur.
2. Students will be able to understand insights into the management, opportunity search, identification of a product, market feasibility studies, project finalization required for small business enterprises.

Lecture	Topic/Chapter Covered	Academic Activity	Test/Assignment
L1	Concepts & Definitions of Entrepreneurship	Lecture	
L2	Entrepreneurship & Economic Development	Lecture	
L3	Classification of Entrepreneurs	Lecture	
L4	Types of Entrepreneurs	Lecture	
L5	Entrepreneurial Competencies	Lecture	
L6	Factors affecting Entrepreneurial Growth (economic & Non Economic)	Lecture	
L7	EDP Programmes	Lecture	
L8	Entrepreneurial Training	Lecture	
L9	Traits & Qualities of an Entrepreneur	Lecture	
L10	Manager vs. Entrepreneurs	Lecture	
L11	Entrepreneurial Challenges	Lecture	
L12	Entrepreneurial Opportunity Search & Identification	Lecture	
L13	Entrepreneurial Opportunity Search & Identification	Lecture	

L14	Criteria to Select a Product	Lecture	
L 15	Conducting Feasibility Studies	Lecture	
L 16	Conducting Feasibility Studies	Lecture	
L17	Source of Business Idea	Lecture	
L 18	Marketing Research Process	Lecture	
L 19	Marketing Mix	Lecture	
L 20	Marketing Mix	Lecture	
L 21	Launching a new product	Lecture	
L 22	Export Marketing	Lecture	
L23	Methods of Project Appraisal	Lecture	
L24	Project Report Preparation	Lecture	Assignment
L25	Specimen of Project Report	Lecture	
L 19	Networking Techniques	Lecture	
L 20	PERT/CPM	Lecture	
L 21	Definitions of Small Scale, Objective, Scope,	Lecture	
L 22	Rationale of SSI	Lecture	
L23	Role of SSI in Economic Development in India	Lecture	
L24	SSI Registration	Lecture	
L25	NOC from Pollution Board	Lecture	
L 26	Machinery & Equipment Selection	Lecture	
L 27	Major Problems faced by SSI, MSME	Lecture	
L 28	MSME Schemes	Lecture	
L29	Challenges and Difficulties in MSME Schemes	Lecture	
L30	Director of Industries DIC, SIDO, SIDBI, SIDC, SISI, NSIC, NISBUD, State financial Corporation SFC	Lecture	
L31	Director of Industries DIC, SIDO, SIDBI, SIDC, SISI, NSIC, NISBUD, State financial Corporation SFC	Lecture	
L32	Venture Capital - Concept	Lecture	
L33	Financing Schemes by various institutions in India	Lecture	
L34	Legal Issues- Forming Business Entity	Lecture	
	Formation of Public/Private Limited Company	Lecture	
L35	Intellectual Property Rights (IPR) & Importance	Lecture	Assignment
L36	Patents	Lecture	
L37	Copyrights	Lecture	
L38	Trademarks	Lecture	
L39	Case Study	Lecture	
L40	Revision Unit-I	Lecture	
L 41	Revision Unit-II	Lecture	

Outcome of Course:

1. Students can be able to write a report and present a presentation on the topics such as project identification, business idea, export marketing.
2. Students will be able to know the different financial and other assistance available for the small industrial units.

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PC-CS-AI ML-213LA	Data Structure and Algorithms Lab						
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
0	0	4	2.0	40	60	100	3
Purpose	To introduce the principles and paradigms of Data Structures for design and implement the software systems logically and physically.						
Course Outcomes (CO)							
CO1	To introduce the basic concepts of Data structure, basic data types, searching and sorting based on array data types.						
CO2	To introduce the structured data types like Stacks and Queue and its basic operation's implementation.						
CO3	To introduce dynamic implementation of linked list.						
CO4	To introduce the concepts of Tree and graph and implementation of traversal algorithms.						

LIST OF EXPERIMENTS:

1. Write a program for Binary search methods.
2. Write a program for insertion sort, selection sort and bubble sort.
3. Write a program to implement Stack and its operation.
4. Write a program for quick sort.
5. Write a program for merge sort.
6. Write a program to implement Queue and its operation.
7. Write a program to implement Circular Queue and its operation.
8. Write a program to implement singly linked list for the following operations: Create, Display, searching, traversing and deletion.
9. Write a program to implement doubly linked list for the following operations: Create, Display, inserting, counting, searching, traversing and deletion.
10. Write a program to implement circular linked list for the following operations: Create, Display, inserting, counting, searching, traversing and deletion.
11. Write a program to implement insertion, deletion and traversing in B tree.

NOTE:

At least seven experiments are to be performed from above list and the concerned institution as per the scope of the syllabus may set remaining eight



PC-CS-AIML-215LA	Object Oriented Programming Lab						
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
0	0	4	2.0	40	60	100	3 Hour
Purpose	To introduce the principles and paradigms of Object Oriented Programming Language for design and implement the Object Oriented System.						
Course Outcomes (CO)							
CO1	To introduce the basic concepts of object oriented programming language and their representation.						
CO2	To allocate dynamic memory, access private members of class and the behavior of inheritance and its implementation.						
CO3	To introduce polymorphism, interface design and overloading of operator.						
CO4	To handle backup system using file, general purpose template and handling of raised exception during programming.						

LIST OF EXPERIMENTS:

Q1. Raising a number to a power is the same as multiplying it by itself p times. Write a function called `power()` that takes a double value for n and an int value for p , and returns the result as double value. Use a default argument of 2 for p , so that if this argument is omitted, the number will be squared. Write a `main()` function that gets values from the user to test this function.

Q2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates. Write a program that uses a structure called `point` to model a point. Define three points, and have the user input values for two of them. Then set the third point equal to the sum of the other two, and display the value of the new point. Interaction with the program might look like this:

Enter coordinates for P1: 3 4

Enter coordinates for P2: 5

7 Coordinates of P1+P2 are : 8, 11

Q3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this. Enter first number, operator, and second number: 10/3

Answer =
3.333333 Do another (Y/N)? Y

Enter first number, operator, second number: 12+100
Answer = 112

Do another (Y/N)? N

Q4. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of a phone number separately. Call the structure `phone`. Create two structure variables of type `phone`. Initialize one, and have the user input a number for the other one. Then display both numbers. The interchange might look like this:

Enter
your area code, exchange, and number: 415 555 1212 My number is (212) 767-8900

Your number is (415) 555-1212

Q5. Create two classes `DM` and `DB` which store the value of distances. `DM` stores distances in metres and centimeters and `DB` in feet and inches. Write a program that can read values for the class objects and add one object of `DM` with another object of `DB`. Use a friend function to carry out the addition operation. The object that stores the results may be a `DM` object or `DB` objects, depending on the units in which the results are required. The display should be in the format of feet and inches or metres and centimetres depending on the object on display.

Q6. Create a class `rational` which represents a numerical value by two double values- `NUMERATOR` and `DENOMINATOR`. Include the following public member Functions:

- constructor with two arguments.
- void `reduce()` that reduces the rational number by eliminating the highest common factor between the numerator and denominator.

- Overload+operator to add two rational number.
- Overload>>operator to enable input through cin.

Overload << operator to enable output through cout. Write a main() to test all the functions in the class.

Q7. Consider the following class definition

```
class father
{protected :intage;
public;
father(intx){age=x;}
virtual void iam()
{ cout<< "I AM THE FATHER, my age is : "<<
age<<endl;};};
```

Derive the two classes son and daughter from the above class and for each, define iam () to write our similar but appropriate messages. You should also define suitable constructors for these classes. Now, write a main () that creates objects of the three classes and then calls iam () for them. Declare pointer to father. Successively, assign addresses of objects of the two derived classes to this pointer and in each case, call iam () through the pointer to demonstrate polymorphism in action.

Q8. Write a program that creates a binary file by reading the data for the students from the terminal. The data of each student consists of roll no., name (a string of 30 or less no. of characters) and marks.

Q9. A hospital wants to create a database regarding its indoor patients. The information to store include

- Name of the patient
- Date of admission
- Disease
- Date of discharge

Create a structure to store the date (year, month and date as its members). Create a base class to store the above information. The member function should include functions to enter information and display a list of all the patients in the database. Create a derived class to store the age of the patients. List the information about all the patients to store the age of the patients. List the information about all the pediatric patients (less than twelve years in age).

Q10. Make a class **Employee** with a name and salary. Make a class **Manager** inherit from **Employee**. Add an instance variable, named department, of type string. Supply a method to **to String** that prints the manager's name, department and salary. Make a class **Executive** inherits from **Manager**. Supply a method **to String** that prints the string "**Executive**" followed by the information stored in the **Manager** superclass object. Supply a test program that tests these classes and methods.

Q11. Imagine a toll booth with a class called toll Booth. The two data items are a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both these to 0. A member function called payingCar() increments the car total and adds 0.50 to the cash total. Another function, called noPayCar (), increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals. Include a program to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the ESC key should cause the program to print out the total cars and total cash and then exit.

Q12. Write a function called reversit () that reverses a string (an array of char). Use a for loop that swaps the first and last characters, then the second and next to last characters and so on. The string should be passed to reversit () as an argument. Write a program to exercise reversit (). The program should get a string from the user, call reversit (), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase, "Able was I ere I saw Elba".

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Q13. Create some objects of the string class, and put them in a Deque-some at the head of the Deque and some at the tail. Display the contents of the Deque using the forEach () function and a user written display function. Then search the Deque for a particular string, using the first That () function and display any strings that match. Finally remove all the items from the Deque using the getLeft() function and display each item. Notice the order in which the items are displayed: Using getLeft (), those inserted on the left (head) of the Deque are removed in "last in first out" order while those put on the right side are removed in "first in first out" order. The opposite would be true if getRight() were used.

Q14. Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed.

Create a class account that stores customer name, account number and type of account. From this derive the classes cur_acct and sav_acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:

- Accept deposit from a customer and update the balance.

- b) Display the balance.
- c) Compute and deposit interest.
- d) Permit withdrawal and update the balance.
- e) Check for the minimum balance, impose penalty, necessary and update the balance.
- f) Do not use any constructors. Use member functions to initialize the class members.

Q15. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function `get_data()` to initialize base class data members and another member function `display_area()` to compute and display the area of figures. Make `display_area()` as a virtual function and redefine this function in the derived classes to suit their requirements. Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively and display the area.

Remember the two values given as input will be treated as lengths of two sides in the case of rectangles and as base and height in the case of triangles and used as follows:

Area of rectangle = $x * y$

Area of triangle = $\frac{1}{2} * x * y$

NOTE:

At least ten experiments are to be performed from above list and the concerned institution as per the scope of the syllabus may set remaining five.



Python Lab-II						
Lecture	Tutorial	Practical	Minor Test	Practical	Total	Time
0	0	2	40	60	100	2
Purpose	To gain a broad understanding of the discipline of machine Learning and its implementation using different libraries.					
Course Outcomes						
CO1	To understand the basic concepts of Python libraries					
CO2	To learn and apply concepts of data manipulation in machine Learning .					
CO3	To learn and apply descriptive analysis concepts.					
CO4	To understand the fundamentals of knowledge representation.					
CO5	To learn and apply concepts of distribution and hypothesis.					
CO6	To understand and implement various data visualization concepts.					

LIST OF PRACTICALS:

1. Write a program to implement of Basic Python Libraries-numpy, scipy.
2. Write a program to implement of Basic Python Libraries-matplotlib, pandas, Scikitlearn.
3. Write a program to create samples from population.
4. Write a program to evaluate Mean, Median, Mode of dataset.
5. Write a program to implement Central Limit Theorem in dataset.
6. Write a program to implement Measure of Spread in dataset.
7. Write a program to implement program to differentiate between descriptive and inferential statistics.
8. Write a program to implement pmf, pdf and cdf.
9. Write a program to implement different visualization techniques on sample dataset.
10. Write a program to implement different hypothesis test on sample dataset.

NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.