



**B.Sc Computer Science with Specialization
in
Artificial Intelligence
&
Machine Learning**

**Curriculum & Syllabus
(Based on Choice Based Credit System)
Effective from the Academic year
2020-2021**

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- PEO 1 :** Graduates will have solid basics in Mathematics, Programming, Machine Learning, Artificial Intelligence fundamentals and advancements to solve technical problems.
- PEO 2 :** Graduates will have the capability to apply their knowledge and skills acquired to solve the issues in real world Artificial Intelligence and Machine learning areas and to develop feasible and reliable systems.
- PEO 3 :** Graduates will have the potential to participate in life-long learning through the successful completion of advanced degrees, continuing education, certifications and/or other professional developments.
- PEO 4 :** Graduates will have the ability to apply the gained knowledge to improve the society ensuring ethical and moral values.
- PEO 5 :** Graduates will have exposure to emerging cutting edge technologies and excellent training in the field of Artificial Intelligence & Machine learning

PROGRAMME OUTCOMES (PO)

- PO 1 :** Develop knowledge in the field of AI & ML courses necessary to qualify for the degree.
- PO 2 :** Acquire a rich basket of value added courses and soft skill courses instilling self-confidence and moral values.
- PO 3 :** Develop problem solving, decision making and communication skills.
- PO 4 :** Demonstrate social responsibility through Ethics and values and Environmental Studies related activities in the campus and in the society.
- PO 5 :** Strengthen the critical thinking skills and develop professionalism with the state of art ICT facilities.
- PO 6 :** Quality for higher education, government services, industry needs and start up units through continuous practice of preparatory examinations.
- PO 7 :** Gain inter-disciplinary, multi-disciplinary competence as value additions.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO 1 : Ability to analyze a problem, and identify and define the AI & ML requirements appropriate to its solution.

PSO 2 : Ability to design, implement, and evaluate a Machine learning system, process, component, or program to solve the given problem.

PSO 3 : Ability to communicate effectively through oral and written means.

PSO 4 : Ability to work in a team to achieve a common goal.

PSO 5 : Enhanced communication and leadership abilities and ability to work and learn in team environment.

PSO 6: Understand the needs of society and sensitivity to societal responsibilities.

Board of Studies Members

- Chairman** : **Dr.P.Swaminathan**, Dean,
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Alumni Member : **Mr.R.Balamurugan,** SCOPUS Ltd, Chennai.

**B.Sc., COMPUTER SCIENCE WITH SPECIALIZATION IN ARTIFICIAL INTELLIGENCE
AND MACHINE LEARNING CURRICULUM**

TOTAL NUMBER OF CREDITS: 140

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER I						
Core		Basics of Artificial Intelligence and Machine Learning	3	0	0	3
Core		Object Oriented Programming using Python	4	0	0	4
Core		Python Programming Lab	0	0	4	2
Core		Mathematics – I	4	0	0	4
AECC		Language-I	5	0	0	5
AECC		English-I	5	0	0	5
TOTAL			21	0	4	23

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER II						
Core		Data Structures and Algorithm	4	0	0	4
Core		Statistical Structure in data using R	3	0	0	3
Core		R Programming Lab	0	0	4	2
Core		Statistics - I	4	0	0	4
AECC		Language-II	5	0	0	5
AECC		English-II	5	0	0	5
TOTAL			21	0	4	23

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER III						
Core		Java Programming	4	0	0	4
Core		Neural Networks	4	0	0	4
Core		Java Programming Lab	0	0	4	2
Core		Advanced Data Base System	4	0	0	4
+Core		Advanced Data Base System Lab	0	0	4	2
Core		Pattern Recognition	4	0	0	4
GE		Generic Electives-I	2	0	0	2
SEC		Skill Enhancement Course-I	2	0	0	2
TOTAL			20	0	8	24

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER IV						
Core		Natural Language Processing	4	0	0	4
Core		Deep Learning	4	0	0	4
Core		Machine Learning and its Applications	4	0	0	4
Core		Machine Learning using WEKA Lab	0	0	4	2
Core		Internet of Things	4		0	4
GE		Generic Electives-II	2	0	0	2
SEC		Skill Enhancement Course-II	2	0	0	2
AECC		Environmental Science	2	0	0	2
TOTAL			22	3	4	24

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER V						
Core		Machine Vision Systems	4	0	0	4
Core		Big Data Analytics	4	0	0	4
Core		Statistical Analysis System/SPSS Programming	4	0	0	4
Core		Statistical Analysis System /SPSS Programming Lab	0	0	4	2
DSE		Discipline Specific Elective-I	4	0	0	4
DSE		Discipline Specific Elective-II	4	0	0	4
SEC		Skill Enhancement Course-III	2	0	0	2
TOTAL			22	0	4	24

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER VI						
Core		Web Mining & Recommender Systems	4	0	0	4
Core		Data Science using Python	4	0	0	4
Core		Data Science Lab	0	0	4	2
DSE		Discipline Specific Elective-III	4	0	0	4
DSE		Discipline Specific Elective-IV	4	0	0	4
DSE		Project work	0	0	8	4
TOTAL			16	0	12	22

LIST OF DISCIPLINE SPECIFIC ELECTIVE COURSES

	Mobile Computing
	Cryptography and its Applications
	Data Mining and Warehousing
	Cloud Computing
	Block Chain Technology
	NoSQL Database
	Security Issues in Machine Learning
	Machine Learning on Cloud
	Knowledge Engineering
	Robotics and its Applications

LIST OF GENERIC ELECTIVE COURSES

	Web Designing
	Client side Scripting Language
	Photoshop
	Flash
	Advanced Excel
	Statistical Package for Social Science
	Office Automation Tools
	Desktop Publishing
	MYSQL
	Cyber Law

LIST OF ABILITY ENHANCEMENT COMPULSORY COURSES

	Tamil Paper – I
	Tamil Paper – II
	French Paper-I
	French Paper-II
	Hindi Paper-I
	Hindi Paper-II
	English Paper-I
	English Paper-II
	Environmental Science

BASICS OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

3 0 0 3

Course Objective:

This course introduces the basic concepts of artificial intelligence and expert systems and also imparts the knowledge of predictions. It introduces students to the basic concepts and techniques of Machine Learning.

Course Outcomes:

CO-1: To develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.

CO-2: To learn the overview of artificial intelligence principles and approaches

CO-3: To understand about fundamental areas of Local Search Algorithms, Adversarial Searching and Neural Networks.

CO-4: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing

CO-5: Represent knowledge of the world using logic and infer new facts from that Knowledge.

CO-6: Demonstrate working knowledge in PROLOG in order to write simple PROLOG programs and explore more sophisticated PROLOG code on their own.

CO-7: To enable students to understand different techniques related to Machine Learning.

CO-8: Distinguish between, supervised, unsupervised and semi-supervised learning.

CO-9: Construct algorithms to learn linear and non-linear models

CO-10: Choose the suitable machine learning methods/algorithms for various type of learning problems

UNIT I INTRODUCTION TO AI 9

Introduction–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents– Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.

UNIT II PROBLEM SOLVING METHODS 9

Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems -Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games.

UNIT III KNOWLEDGE REPRESENTATION 9

First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward

Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories - Reasoning with Default Information

UNIT IV MACHINE LEARNING BASICS 9

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

UNIT V LINEAR MODELS 9

Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines.

TOTAL: 45 Hours

Text Books:

1. Deepak Khemani “Artificial Intelligence”, Tata Mc Graw Hill Education 2013.
2. Bratko, —Prolog: Programming for Artificial Intelligencel, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.

Books for References:

1. S. Russell and P. Norvig, “Artificial Intelligence: A Modern Approachl, Prentice Hall, Third Edition 2009.
2. M. Tim Jones, —Artificial Intelligence: A Systems Approach(Computer Science)l, Jones and Bartlett Publishers, Inc.; First Edition, 2008
3. <http://nptel.ac.in/>
3. Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)l, Third Edition, MIT Press, 2014

4. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionalsl, First Edition, Wiley, 2014
5. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Datal, First Edition, Cambridge University Press, 2012.

Course Objective:

Describe the core syntax and semantics of Python programming language, Discover the need for working with the strings and functions and to Infer the Object-oriented Programming concepts in Python.

Course Outcomes:

CO-1: Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.

CO-2: Express proficiency in the handling of strings.

CO-3: Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.

CO-4: Identify the commonly used operations involving regular expressions.

CO-5: Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.

CO-6: To gain the knowledge of Python Built-in Functions.

CO-7: An ability to write File handling programs.

CO-8: An understanding the concepts user defined functions.

CO-9: An ability to write classes with multiple objects.

CO-10: To gain the knowledge of Python Attributes and Constructors.

UNIT I PARTS OF PYTHON PROGRAMMING LANGUAGE 12

Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, The type() Function and Is Operator, Dynamic and Strongly Typed Language, Control Flow Statements, The if Decision Control Flow Statement, The if...else Decision Control Flow Statement, The if...elif...else Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements, Catching Exceptions Using try and except Statement, Functions, Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.

UNIT II STRINGS & DICTIONARIES 12

Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings, Lists, Creating Lists,

Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, The del Statement. **Dictionaries:** Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, The del Statement, Tuples and Sets, Creating Tuples, Basic Tuple Operations, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Tuple Methods, Using zip() Function, Sets, Set Methods, Traversing of Sets, Frozenset.

UNIT III FILES 12

Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules, Regular Expression Operations, Using Special Characters, Regular Expression Methods, Named Groups in Python Regular Expressions, Regular Expression with glob Module.

UNIT IV OBJECT-ORIENTED PROGRAMMING, CLASSES AND OBJECTS 12

Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, The Polymorphism

UNIT V CASE STUDY 12

Working with the sample Python programs – Using Functions, Strings, Dictionaries, Files and OOP Concepts.

Total: 60 Hours

Text Books:

1. Gowrishankar S, Veena A, “Introduction to Python Programming”, 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372

References:

1. Jake VanderPlas, “Python Data Science Handbook: Essential Tools for Working with Data”, 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058
2. Aurelien Geron, Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems”, 1st Edition, O'Reilly Media, 2017. ISBN – 13: 978-1491962299.
3. Wesley J Chun, “Core Python Applications Programming”, 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365
4. Miguel Grinberg, “Flask Web Development: Developing Web Applications with Python”, 2nd Edition, O'Reilly Media, 2018. ISBN-13: 978-1491991732.

Course Objective:

To implement Python programs with conditionals and loops. Also represent compound data using Python lists, tuples, dictionaries and Read and write data from/to files in Python.

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. First n prime numbers
8. Multiply matrices
9. Programs that take command line arguments (word count)
10. Find the most frequent words in a text read from a file
11. Simulate elliptical orbits in Pygame
12. Simulate bouncing ball using Pygame

Course Objective:

To familiarize the students with linear and nonlinear data structures, to understand sorting and searching, to manipulate the complexity of data structures using asymptotic notations and to apply the data structures in solving problems.

Course Outcomes:

CO-1: Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.

CO-2: Understand basic data structures such as arrays, linked lists, stacks and queues.

CO-3: Describe the hash function and concepts of collision and its resolution methods.

CO-4: Solve problem involving graphs, trees and heaps.

CO-5: Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.

CO-6: Correctly use recursion to solve a problem with a binary search tree or graph.

CO-7: Correctly implement the right data structure for a given problem.

CO-8: Correctly determine the relative runtimes of different algorithms.

CO-9: Analyze unstructured problems and design computer solutions.

CO-10: Apply or create suitable algorithm to solve a particular problem.

UNIT I INTRODUCTION TO DATA STRUCTURES 12

Introduction to Data Structures- Why Data Structures – Operations of Data Structures – Data Types – Arrays and Lists – Representation Of Arrays – Operations On Arrays - Abstract Data Types (ADTs) – List ADT.

UNIT II LINEAR DATA STRUCTURES 12

Stack: Operations of Stack – Representation – Implementation – Infix to Postfix Conversion – Postfix Evaluation – Recursion – Maze Problem – Queue: Operations of Queue – Representation – Implementation – Job Processing using Queue – Circular Queue – Double Ended Queue – Linked List: Representation – Implementation – Polynomial Addition – Doubly Linked List – Circular List – Circular Doubly Linked List.

UNIT III NON LINEAR DATA STRUCTURES 12

Non Linear Data Structures – Trees: Terminologies in Trees – Representation – Types of Trees – Forest – Transforming Forest into Binary Trees - Traversal Techniques – Applications of Trees – Graphs:

Terminologies in Graphs – Representation – Depth First Search – Breadth First Search – Applications of Graphs – Shortest Path- Travelling Salesman Problem – Dijkstra’s Algorithm – Types of Graphs.

UNIT IV SORTING AND SEARCHING

12

Sorting: Bubble Sort – Selection Sort – Merge Sort – Insertion Sort – Quick Sort – Heap Sort – Searching: Linear Search – Binary Search – Divide and Conquer – Hashing - Hash Table – Direct Address Method – Mapping Function – Handling Collision.

UNIT V COMPLEXITY AND CASE STUDIES

12

Asymptotic Notation – Big Oh Notation – Omega Notation – Theta Notation – Complexity: Space Complexity – Time Complexity – Space and Time Complexities of Data Structures – Case Studies: Searching for Patterns- Inventing a new sorting Algorithm - Synthesizing Concurrent Graph Data Structures.

Total: 60 Hours

Text Books:

1. Gav Pai “ Data structures and algorithms, concepts, techniques and Applications”, McGraw Hill, ISBN – 9780070667266,2017.
2. E.Horowitz and S.Shani Fundamentals of Data Structures in C++, Galgotia Pub.2009.
3. Horowitz, S. Sahni, and S. Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt. Ltd., 2012.
4. R. Kruse C.L. Tondo and B. Leung, Data Structures and Program design in C, PFU, 1997.

Course Objective:

To use R for statistical programming, computation, graphics, and modeling, write functions and use R in an efficient way and be able to develop programs and use for their research.

Course Outcomes:

CO-1: Understand the basics of R programming including matrix and vectors etc.

CO-2: Recognize and make appropriate use of different types of data structures.

CO-3: Identify and implement appropriate control structures to solve a particular programming problem.

CO-4: Design and write functions in R and implement simple iterative algorithms.

CO-5: Perform appropriate statistical tests using R Create and edit visualizations.

CO-6: Understand the foundations of and be able to design and describe simulation studies

CO-7: Be familiar with data visualization techniques in R in an efficient way.

CO-8: Expertise in the probability distribution tools such as ANOVA.

CO-9: Ability to implement simple algorithms in R independently

CO-10: To expand their knowledge of R and build the Linear Models in R.

UNIT I INTRODUCTION 12

Introduction, How to run R, R Sessions, and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.

UNIT II R PROGRAMMING STRUCTURES 12

Control Statements, Loops, – Looping Over Non vector Sets,- If-Else, Arithmetic, and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quicksort Implementation-Extended Extended Example: A Binary Search Tree.

UNIT III MATH AND SIMULATION IN R 12

Math Function, Extended Example Calculating Probability- Cumulative Sums and Products-Minima and Maxima- Calculus, Functions Fir Statistical Distribution, Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Extended Example: Finding Stationary Distribution of Markov Chains, Set Operation, Input /out put, Accessing the Keyboard and Monitor, Reading and writer Files,

UNIT IV GRAPHICS AND PROBABILITY DISTRIBUTIONS 12

Creating Graphs, The Workhorse of R Base Graphics, the plot() Function – Customizing Graphs, Saving Graphs to Files. Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,-ANOVA.

UNIT-VI LINEAR MODELS AND CASE STUDY

12

Simple Linear Regression, -Multiple Regression Generalized Linear Models, Logistic Regression, – Poisson Regression- other Generalized Linear Models-Survival Analysis, Nonlinear Models, Splines- Decision- Random Forests – Case study on simple R programs.

TOTAL: 60 Hours

Text Books:

1. Cornillon Pierre Andre Et AI , “R for statistics”, T and F India, ISBN 9781439881453, 2015.
2. Venables, W. N., and Ripley, B. D. “Modern Applied Statistics with S” , 4th ed., Springer-Verlag, New York, 2012

Course Objective:

The course is designed to provide Basic knowledge of R Programming. This Lab course will yield a complete knowledge on how to write basic programs and high level applications using concepts R programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn how to program in R and how to use R for effective data analysis. It refers a statistical programming environment and describe generic programming language concepts as they are implemented in a high-level statistical language. The course covers practical issues in statistical computing. Student interested in using computation to enhance their problem solving abilities.

1. Write a R Program to Make a Simple Calculator.
2. Write a program to find Sum of Natural Numbers Using Recursion.
3. Write a program to find Fibonacci Sequence Using Recursion in R.
4. Write a program to implement R Program for the Factors of a Number.
5. Write a program to to Find the Sum of Natural Numbers.
6. Write a program to Check if a Number is Positive, Negative or Zero.
7. Write a program to Find the “Hello World” Program.
8. Write a program to Program to Add Two Vectors.
9. Write a function to Find Minimum and Maximum.
10. Write a program to Sort a Vector.
11. Write a R Program to Check for Leap Year.
12. Write a program to multiply two Matrices.

Course Objective:

The course provides insight knowledge about object oriented programming concepts and programming language in JAVA.

Course Outcomes:

CO-1: Develop an in-depth understanding of object-oriented programming concepts

CO-2: An understanding of the concepts of inheritance and polymorphism and ability to overload operators.

CO-3: An understanding of the difference between function overloading and function overriding

CO-4: An ability to incorporate exception handling in object-oriented programs

CO-5: An ability to use overloading Methods.

CO-6: An ability to write object-oriented programs of moderate complexity in Java.

CO-7: Learn syntax, features of, and how to utilize the Standard Template Library. Learn other features of the C++ language including templates, exceptions, forms of casting, conversions, covering all features of the language.

CO-8: An ability to write object-oriented programs of moderate complexity in Java.

CO-9: An understanding the concepts of class, objects and methods in java and strings.

CO-10: An ability to create packages, accessing a package and adding a class to package and threads.

Unit I INTRODUCTION 12

Introduction to Java - Features of Java - Object Oriented Concepts - Lexical Issues - Data Types - Variables - Arrays - Operators - Control Statements.

Unit II CLASSES AND OBJECTS 12

Classes - Objects - Constructors - Overloading method - Access Control - Static and fixed methods - Inner Classes - String Class - Inheritance - Overriding methods - Using super- Abstract class.

Unit III PACKAGES 12

Packages - Access Protection - Importing Packages - Interfaces - Exception Handling - Throw and Throws - Thread - Synchronization - Messaging - Runnable Interface - Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads - Multithreading.

Unit IV I/O STREAMS**12**

I/O Streams - File Streams - Applets - String Objects - String Buffer - Char Array - Java Utilities - Code Documentation

Unit5 V NETWORK BASICS**12**

Networks basics - Socket Programming - Proxy Servers - TCP/IP Sockets - Net Address - URL – Datagrams - Working with windows using AWT Classes - AWT Controls - Layout Managers and Menus.

Total: 60 Hrs**Text Books:**

1. R.Nageswara Rao, “Core Java : An Integrated Approach, New: Include All versions upto Java 8, John Wiley, ISBN 9789351199250, 2016
2. Cay S.Horstmann, Gary Cornell - Core Java 2 Volume I - Fundamentals,5th Edn. PHI,2000.
3. P. Naughton and H. Schildt - Java2 (The Complete Reference) - Third Edition,TMH 1999.
4. K. Arnold and J. Gosling - The Java Programming Language - Second Edition, Addison Wesley, 1996.

Course Objectives:

Provide an understanding of the basic mathematical elements of the theory of fuzzy sets. Provide an emphasis on the differences and similarities between fuzzy sets and classical sets theories. Explain the concepts of **neural networks**, fuzzy logic, and genetic algorithms.

Course Outcomes:

CO-1: Able to understand the Architecture of different neural networks.

CO-2: Understand a wide variety of learning algorithms.

CO-3: Understand about supervised learning.

CO-4: Understand about unsupervised learning.

CO-4: Provide understanding of techniques and concepts.

CO-5: Understanding limitations of various learning algorithms.

CO-6: Provide a way to evaluate performance of learning algorithms.

CO-7: Apply the algorithms to a real-world problem, optimize the models learned.

CO-8: Provides knowledge about associative memory networks.

CO-9: Able to implement learning models for real life applications.

CO-10: Able to implement different concepts and algorithms for practical applications.

UNIT I BASIC LEARNING ALGORITHMS**12**

Biological Neuron – Artificial Neural Model - Types of activation functions – Architecture: Feedforward and Feedback – Learning Process: Error Correction Learning – Memory Based Learning – Hebbian Learning – Competitive Learning - Boltzman Learning – Supervised and Unsupervised Learning – Learning Tasks: Pattern Space – Weight Space – Pattern Association – Pattern Recognition – Function Approximation – Control – Filtering - Beamforming – Memory – Adaptation - Statistical Learning Theory – Single Layer Perceptron – Perceptron Learning Algorithm – Perceptron Convergence Theorem – Least Mean Square Learning Algorithm – Multilayer Perceptron – Back Propagation Algorithm – XOR problem – Limitations of Back Propagation Algorithm.

UNIT II RADIAL-BASIS FUNCTION NETWORKS AND SUPPORT VECTOR MACHINES

RADIAL BASIS FUNCTION NETWORKS

12

Cover's Theorem on the Separability of Patterns - Exact Interpolator – Regularization Theory – Generalized Radial Basis Function Networks - Learning in Radial Basis Function Networks Applications: XOR Problem – Image Classification. **SUPPORT VECTOR MACHINES:** Optimal Hyperplane for Linearly Separable Patterns and Non separable Patterns – Support Vector - insensitive Loss Function – Support Vector Machine for Pattern Recognition – XOR Problem - Machines for Nonlinear Regression

UNIT III COMMITTEE MACHINES AND NEURODYNAMICS SYSTEMS 12

Ensemble Averaging - Boosting – Associative Gaussian Mixture Model – Hierarchical Mixture of Experts Model(HME) – Model Selection using a Standard Decision Tree – A Priori and Postpriori Probabilities – Maximum Likelihood Estimation – Learning Strategies for the HME Model – EM Algorithm – Applications of EM Algorithm to HME Model - Dynamical Systems – Attractors and Stability – Non-linear Dynamical Systems- Lyapunov Stability – Neuro dynamical Systems – The Cohen-Grossberg Theorem.

UNIT IV ATTRACTOR NEURAL NETWORKS

12

Associative Learning – Attractor Neural Network Associative Memory – Linear Associative Memory – Hopfield Network – Content Addressable Memory – Strange Attractors and Chaos- Error Performance of Hopfield Networks - Applications of Hopfield Networks – Simulated Annealing – Boltzmann Machine – Bidirectional Associative Memory – BAM Stability Analysis – Error Correction in BAMs - Memory Annihilation of Structured Maps in BAMS – Continuous BAMs – Adaptive BAMs – Applications

UNIT V SELF ORGANISING MAPS AND PULSED NEURON MODELS

12

Self-organizing Map – Maximal Eigenvector Filtering – Sanger's Rule – Generalized Learning Law – Competitive Learning - Vector Quantization – Mexican Hat Networks - Self-organizing Feature Maps – Applications - Spiking Neuron Model – Integrate-and-Fire Neurons – Conductance Based Models – Computing with Spiking Neurons.

TOTAL: 60 hrs

Text Books :

1. Nunes Da Silva I, "Artificial Neural Networks A Practical Course", SPRINGER, ISBN - 9783319431611 , January 2017
2. Satish Kumar, "Neural Networks: A Classroom Approach", Tata McGraw-Hill Publishing Company Limited, New Delhi, 2004.
3. Simon Haykin, "Neural Networks: A Comprehensive Foundation", 2ed., Addison Wesley Longman (Singapore) Private Limited, Delhi, 2001.

Course Objective:

To make the student learn an object oriented way of solving problems using **java**. To make the students to write programs using multithreading concepts and handle exceptions. To make the students to write programs that connects to a database and be able to perform various operations.

1. Finding area and Perimeter of a circle. Use Buffered Reader class.
2. Substring Removal from a String. Use StringBuffer Class.
3. Determining the order of numbers generated randomly using Random Class.
4. Implementation of Point Class for Image manipulation.
5. Usage of Calender Class and manipulation.
6. String Manipulation using Char Array.
7. Database Creation for storing e-mail addresses and manipulation.
8. Usage of Vector Classes.
9. Implementing Thread based applications & Exception Handling.
10. Working with Dialogs and Menus.
11. Incorporating Graphics.
12. Working with Colors and Fonts.

Course Objective

This course aims to give students in depth information about system implementation techniques, data storage, representing data elements, database system architecture, the system catalog, query processing and optimization, transaction processing concepts, concurrency control techniques, distributed databases and client server architecture, advanced database concepts, and emerging technologies and applications.

Course Outcomes

CO-1: Ability to define a problem at the view level & ability to understand the physical structure of the database to handle data.

CO-2: Students would be able to apply the logic in different applications.

CO-3: Ability to normalize the database & understand the internal data structure.

CO-4: Students would clearly understand the transaction system & could extract data efficiently.

CO-5: Define user accounts and associated resources and privileges

CO-6: Make backup copies and recover the state of the DB after a system failure

CO-7: Establish and manage audit controls

CO-8: Understand the notion of transaction and its ACID properties

CO-9: Have knowledge of concurrency control mechanisms

CO-10: Define links between databases on different nodes and work with the multiple databases

UNIT I QUERY EXECUTION

12

Introduction to Physical-Query-Plan Operators - One-Pass Algorithms for Database – Operations - Nested-Loop Joins - Two-Pass Algorithms Based on Sorting - Two-Pass - Algorithms Based on Hashing - Index-Based Algorithms - Buffer Management - Parallel Algorithms for Relational Operations - Using Heuristics in Query Optimization - Basic Algorithms for Executing Query Operations.

UNIT II CONCURRENCY CONTROL SERIALIZABILITY

12

Enforcing - Serializability by Locks - Locking Systems With Several - Lock Modes - Architecture for a Locking Scheduler Managing Hierarchies of Database Elements - Concurrency Control by Timestamps - Concurrency Control by Validation - Database recovery management.

UNIT III TRANSACTION PROCESSING

12

Introduction of transaction processing - advantages and disadvantages of transaction processing system - online transaction processing system -serializability and recoverability - view

serializability - resolving deadlock - distributed locking - Transaction management in multi-database system - long duration transaction - high-performance transaction system.

UNIT IV DISTRIBUTED DATABASE

12

Introduction of DDB - DDBMS architectures - Homogeneous and Heterogeneous databases - Distributed data storage - Advantages of Data Distribution - Disadvantages of Data Distribution Distributed Transactions -Commit protocols – Availability - Concurrency control & recovery in distributed databases - Directory systems - Data Replication - Data Fragmentation - Distributed database transparency features - distribution transparency.

UNIT V DATABASE APPLICATION

12

Active database - starburst, oracle, DB2, chimera - Applications of active database, design principles for active rules - Temporal database, special, text and multimedia database - Video database management: storage management for video - video preprocessing for content representation and indexing, image and semantic- based query processing - real time buffer management.

Total : 60 Hours

Text Books:

1. Kifer, “Database Systems: An- Application – oriented Approach”, 2nd Edition, Pearson India, ISBN – 9788131703748, 2011.
2. Date C. J, “An Introduction to Database Systems”, Addison Wesley Longman, 8th Edition, 2003.
3. Catell, R.G.G., Barry, D.K., Berler, M., et al, “The Object Data Standard: ODMG 3.0”, Morgan Kaufmann, 2000.
4. Silberschatz A., Korth H., and Sudarshan S, “Database System Concepts”, McGraw- Hill, 6th Edition, 2010.

Reference Books:

1. Charles F. Goldfarb, Paul Prescod, “The XML Handbook, Prentice Hall”, 5th Edition, 2004.
2. Thomas M. Connolly, Carolyn Begg, “Database Systems: Practical approach to Design, Implementation and Management”, Pearson Education Limited, 6th edition, 2012.

Course Objective

The student learns to work in PL/SQL Cursors, Stored Procedures, Collections, Transactions and Error Handling. The students will also be able to implement Timestamp ordering Protocol and Deadlock Avoidance concepts.

1. Learning basic DDL, DML, DCL and TCL commands
2. Working with dual table.
3. PL/SQL-Data types, control structures.
4. Creating Stored Procedures with PL/ SQL.
5. Error handling in PL/ SQL.
6. Cursor Management in PL/ SQL.
7. Writing Programs on Packages & Triggers.
8. PL/SQL – Collections
9. PL/SQL- Transactions
10. Embedding PL/SQL in high level language.
11. Implement Timestamp Ordering Protocol in PL/SQL.
12. Implement Deadlock Avoidance in PL/SQL.

Course Objective

To enable students to critically analyze, design and create innovative products and solutions for the real life problems. To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to tackle gaps.

Course Outcomes

CO-1: Apply mathematical foundations, algorithmic principles and computer science theory in the modeling and design of computer based systems of varying complexity.

CO-2: Critically analyze a problem, identify, formulate and solve problems in the field of Computer Science and Engineering considering current and future trends.

CO-3: Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health, safety, and sustainability in the field of computer engineering

CO-4: Demonstrate an ability to engage in lifelong learning for professional development

CO-5: Demonstrate advanced knowledge of a selected area within the computer science discipline.

CO-6: Critically analyze existing literature in an area of specialization and develop innovative and research oriented methodologies to tackle gaps identified.

CO-7: Apply performance evaluation methods for pattern recognition and critique comparisons of techniques made in the research literature.

CO-8: Apply pattern recognition techniques to real-world problems such as document analysis and recognition.

CO-9: Implement simple pattern classifiers, classifier combinations and structural pattern recognizers.

CO-10: Explain and compare a variety of pattern classification, structural pattern recognition and pattern classifier combination techniques.

UNIT I

PATTERN CLASSIFIER

12

Overview of pattern recognition – Discriminant functions – Supervised learning – Parametric estimation – Maximum likelihood estimation – Bayesian parameter estimation – Perceptron

algorithm – LMSE algorithm – Problems with Bayes approach – Pattern classification by distance functions – Minimum distance pattern classifier.

UNIT II UNSUPERVISED CLASSIFICATION 12

Clustering for unsupervised learning and classification – Clustering concept – C- means algorithm – Hierarchical clustering procedures – Graph theoretic approach to pattern clustering – Validity of clustering solutions.

UNIT III STRUCTURAL PATTERN RECOGNITION 12

Elements of formal grammars – String generation as pattern description – Recognition of syntactic description – Parsing – Stochastic grammars and applications – Graph based structural representation.

UNIT IV FEATURE EXTRACTION AND SELECTION 12

Entropy minimization – Karhunen – Loeve transformation – Feature selection through functions approximation – Binary feature selection.

UNIT V RECENT ADVANCES AND CASE STUDY 12

Neural network structures for Pattern Recognition – Neural network based Pattern associators – Unsupervised learning in neural Pattern Recognition – Self-organizing networks – Fuzzy logic – CASESTUDY : Fuzzy pattern classifiers – Pattern classification using Genetic Algorithms.

Total: 60 Hours

Text Books:

1. Earl Gose and Richard Johnsonbaugh and Steve Jost Pattern Recognition And Image Analysis (With Cd), 1st Edition, Pearson India ISBN-,9789332549791 ,2015.
2. Robert J.Schalkoff, “Pattern Recognition Statistical, Structural and Neural Approaches”, John Wiley & Sons Inc., New York, 1992.
3. Tou and Gonzales, “Pattern Recognition Principles”, Wesley Publication Company, London,1974.

Reference Books:

1. Duda R.O. and Har P.E., “Pattern Classification and Scene Analysis”, Wiley, New York, 1973.
2. Morton Nadier and Eric Smith P, “Pattern Recognition Engineering”, John Wiley & Sons, New York, 1993.

Course Objective

The Course provides the models, methods, and algorithms of statistical Natural Language Processing (NLP) for common NLP tasks, such as speech recognition, machine translation, spam filtering, text classification and spell checking.

Course Outcomes

- CO-1:** An ability to apply core computer science concepts and algorithms, such as dynamic programming.
- CO-2:** To understand the linguistic phenomena and to explore the linguistic features relevant to each NLP task.
- CO-3:** Can apply the methods to new NLP problems and will be able to apply the methods to problems outside NLP.
- CO-4:** The student will be familiar with some of the NLP literature and will read and suggest improvements to published work.
- CO-5:** The student will also analyze experimental results and write reports for each course project to develop scientific writing skills.
- CO-6:** To understand natural language processing and to learn how to apply basic algorithms in this field.
- CO-7:** To get acquainted with the algorithmic description of the main language levels: morphology, syntax, semantics, and pragmatics, as well as the resources of natural language data .
- CO-8:** Understanding of state-of-the-art algorithms and techniques for text-based processing of natural language.
- CO-9:** To demonstrate understanding of human languages and be familiar with the most main stream descriptive and theoretical frameworks for handling their properties.
- CO-10:** To be able to determine when a problem's complexity requires an NLP solution.

UNIT I OVERVIEW AND LANGUAGE MODELING**12**

Overview - Origins and challenges of NLP-Language and Grammar-Processing Indian Languages - NLP Applications-Information Retrieval - Language Modeling: Various Grammar - based Language Models - Statistical Language Model.

UNIT II WORD LEVEL AND SYNTACTIC ANALYSIS**12**

Word Level Analysis - Regular Expressions - Finite-State Automata - Morphological Parsing
- Spelling Error Detection and correction - Words and Word classes - Part-of Speech Tagging.
Syntactic Analysis – Context - free Grammar - Constituency - Parsing - Probabilistic Parsing.

UNIT III SEMANTIC ANALYSIS AND DISCOURSE PROCESSING**12**

Semantic Analysis - Meaning Representation - Lexical Semantics – Ambiguity - Word Sense
Disambiguation - Discourse Processing – cohesion - Reference Resolution - Discourse Coherence
and Structure.

UNIT IV NATURAL LANGUAGE GENERATION AND MACHINE TRANSLATION**12**

Natural Language Generation - Architecture of NLG Systems - Generation Tasks and
Representations - Application of NLG. Machine Translation - Problems in Machine Translation -
Characteristics of Indian Languages - Machine Translation Approaches - Translation involving
Indian Languages.

UNIT V CASE STUDY and INFORMATION RETRIEVAL**12**

Information Retrieval - Design features of Information Retrieval Systems – Classical - Non- classical
- Alternative Models of Information Retrieval – case study on valuation Lexical Resources, World
Net - Frame Net - Stemmers - POS Tagger - Research Corpora.

Total: 60 Hours**Text Books:**

1. Tanveer Siddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”,
Oxford University Press, 2012.

Reference Books:

1. Daniel Jurafsky and James H Martin, “Speech and Language Processing: An introduction to
Natural Language Processing, Computational Linguistics and Speech Recognition”, 2nd
Edition, Prentice Hall, 2008.
2. James Allen, “Natural Language Understanding”, 2nd edition, Benjamin /Cummings
publishing company, 1995.

Course Objective

Deep Learning has received a lot of attention over the past few years and has been employed successfully by companies like Google, Microsoft, IBM, Facebook, Twitter etc. to solve a wide range of problems in Computer Vision and Natural Language Processing. In this course we will learn about the building blocks used in these Deep Learning based solutions. Specifically, we will learn about feedforward neural networks, convolutional neural networks, recurrent neural networks and attention mechanisms. At the end of this course students would have knowledge of deep architectures used for solving various Vision and NLP tasks.

Course Outcomes

CO-1: Thoroughly Understanding the fundamentals of Deep Learning.

CO-2: To know the main techniques in deep learning and the main research in this field.

CO-3: To know the main variants of deep learning (such convolutional and recurrent architectures), and their typical applications.

CO-4: Gaining knowledge of the different modalities of Deep learning currently used.

CO-5: Able to visualize the Convolutional Neural Networks, and study vectorial representations of Words.

CO-6: Gaining Knowledge about State-of-the art models and Other Important Works in recent years.

CO-7: Be able to design and implement deep neural network systems.

CO-8: Be able to identify new application requirements in the field of computer vision.

CO-9: Implement deep learning algorithms and solve real-world problems.

CO-10: Be able to structure and prepare scientific and technical documentation describing project activities.

UNIT I HISTORY OF DEEP LEARNING**12**

Deep Learning Success Stories- McCulloch Pitts Neuron- Thresholding Logic- Perceptrons - Perceptron Learning Algorithm - Multilayer Perceptrons (MLPs)- Representation Power of MLPs- Sigmoid Neurons - Gradient Descent - Feedforward Neural Networks - Representation Power of Feedforward Neural Networks – Feed Forward Neural Networks – Backpropagation.

UNIT II ALGORITHMS**12**

Gradient Descent (GD)- Momentum Based GD- Nesterov Accelerated GD- Stochastic GD – AdaGrad – RMSProp – Adam- Eigenvalues and eigenvectors - Eigenvalue Decomposition Basics - Principal Component Analysis and its interpretations – Singular Value Decomposition.

UNIT III AUTOENCODERS AND REGULARIZATION**12**

Autoencoders and relation to PCA - Regularization in autoencoders – Denoising autoencoders Sparse autoencoders - Contractive autoencoders - Regularization: Bias Variance Tradeoff - L2 regularization - Early stopping - Dataset augmentation - Parameter sharing and tying - Injecting noise at input - Ensemble methods – Dropout.

UNIT IV GREEDY LAYERS AND CONVOLUTIONAL NEURAL NETWORKS 12

Greedy Layerwise Pre-training - Better activation functions - Better weight initialization methods - Batch Normalization - Learning Vectorial Representations of Words - Convolutional Neural Networks - LeNet, AlexNet, ZF-Net, VGGNet, GoogLeNet, ResNet - Visualizing Convolutional Neural Networks - Guided Backpropagation - Deep Dream, Deep Art - Fooling Convolutional Neural Networks

UNIT V RECURRENT NEURAL NETWORKS AND APPLICATIONS 12

Recurrent Neural Networks – Back Propagation Through Time (BPTT) - Vanishing and Exploding Gradients - Truncated BPTT, GRU, LSTMs - Encoder Decoder Models - Attention Mechanism - Attention over images - Applications: Vision, NLP, Speech.

Total: 60 Hours**Text Books:**

1. Ian Good fellow and Yoshua Bengio and Aaron Courville, “Deep Learning, An MIT Press book”, 2012.

Reference Books:

1. Raúl Rojas, “Neural Networks: A Systematic Introduction” , 1996.
2. Christopher Bishop, “Pattern Recognition and Machine Learning”, 2007.

Course Objective:

This course provides basics for understanding underlying machine learning theory and to formulate machine learning problems corresponding to different applications.

Course Outcomes:

CO-1: Develop an appreciation for what is involved in learning models from data.

CO-2: Understand a wide variety of learning algorithms.

CO-3: Understand how to evaluate models generated from data.

CO-4: Provide understanding of techniques, mathematical concepts.

CO-5: Understanding limitations of various machine learning algorithms.

CO-6: Provide a way to evaluate performance of machine learning algorithms.

CO-7: Apply the algorithms to a real-world problem, optimize the models learned.

CO-8: Generate Report on the expected accuracy that can be achieved by applying the models.

CO-9: Able to implement deep learning models for language, vision, speech, decision making.

CO-10: Practice software implementation of different concepts and algorithms.

UNIT I INTRODUCTION 12

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II NEURAL NETWORKS AND GENETIC ALGORITHMS 12

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

UNIT III BAYESIAN AND COMPUTATIONAL LEARNING 12

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV INSTANT BASED LEARNING 12

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT V ADVANCED LEARNING 12

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Case Study:

Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task .

Total: 60 hours

Text Books:

1. Mitchell , “Machine learning” , Tata Mcgraw Hill Education Private Limited ,ISBN 9781259096952, 2013
2. Stephen Marsland, Taylor & Francis, “ Machine Learning: An Algorithmic Perspective”, 2nd Edition. Mit Press, 2012.

References:

1. Understanding Machine Learning. Shai Shalev-Shwartz and Shai Ben-David. Cambridge University Press. 2017. [SS-2017]
2. The Elements of Statistical Learning. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Second Edition. 2009. [TH-2009]
3. Foundations of Data Science. Avrim Blum, John Hopcroft and Ravindran Kannan. January 2017. [AB-2017]
4. Pattern Recognition and Machine Learning. Christopher Bishop. Springer. 2006. [CB-2006].

Course Objective: Learn how to build a data warehouse and query it. Also obtain Practical Experience Working with all real data sets using WEKA.

1. Build Data Warehouse and Explore WEKA
2. Perform data preprocessing tasks.
3. Demonstration of preprocessing on dataset labor.arff
4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
5. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm
6. Demonstrate performing Regression on data sets
7. Demonstration of classification rule process on dataset employee.arff using id3 algorithm
8. Demonstration of classification rule process on dataset student.arff using j48 Algorithm
9. Demonstration of classification rule process on dataset employee.arff using j48 algorithm
10. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
11. Demonstration of clustering rule process on dataset iris.arff using simple k-means
12. Demonstration of clustering rule process on dataset student.arff using simple kmeans

Course Objective

To understand the fundamentals of Internet of Things and to apply the concept in Real World Scenario.

Course Outcome

CO-1: To assess the vision and introduction of IoT.

CO-2: To Understand IoT Market perspective.

CO-3: To Implement Data and Knowledge Management and use of Devices in IoT technology.

CO-4: To Understand State of the Art - IoT Architecture.

CO-5: To classify Real World IoT Design Constraints, Industrial Automation in IoT.

CO-6: To understand where the IoT concept fits within the broader ICT industry and possible future Trends

CO-7: To Understand and be able to explain the role of big data, cloud computing and data analytics in a typical IoT system

CO-8 : Able to understand building blocks of Internet of Things and characteristics.

CO-9: Able to understand the application areas of IOT.

CO-10: Apply effective techniques to create IoT based projects.

UNIT I OVERVIEW 12

IoT-An Architectural Overview- Building an architecture - Main design principles and needed capabilities - An IoT architecture outline - Standards considerations.

UNIT II M2M AND IOT TECHNOLOGY FUNDAMENTALS 12

Devices and gateways- Local and wide area networking- Data management- Business processes in IoT- Everything as a Service (XaaS) - M2M and IoT Analytics- Knowledge Management.

UNIT III REFERENCE ARCHITECTURE 12

Introduction - IoT reference Model - IoT Reference Architecture-Functional View- Information View- Deployment and Operational View- Other Relevant architectural views.

UNIT IV REAL-WORLD DESIGN CONSTRAINT**12**

Introduction- Technical Design constraints - Data representation and visualization, Interaction and remote control. IoT systems management - IoT Design Methodology - specifications - Integration and Application Development.

UNIT V CASE STUDY**12**

Case Study - Various Real time applications of IoT- Connecting IoT to cloud - Cloud Storage for Iot - Data Analytics for IoT - Software & Management Tools for IoT.

Total Hours: 60 hours**Text Boks:**

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Aves and, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

Reference Books:

1. Peter Waher, "Learning Internet of Things", PACKT publishing, Birmingham, Mumbai, 2005.
2. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2012.

processing, interfacing machine vision system, vision system calibration, industrial robot control, mobile robot application, Competing technologies, CCD line scan and area scan sensor, Videcon and other cameras, Triangulation geometry, resolution passive and active stereo imaging, laser scanner, data processing.

UNIT III IMAGE PROCESSING 12

Image processing: Machine Vision Software, Fundamentals of Digital Image, Image Acquisition Modes, Image Processing in Spatial and Frequency Domain, Point Operation, Thresholding, Grayscale Stretching, Neighborhood Operations, Image Smoothing and Sharpening, Edge Detection, Binary Morphology Color image processing. Image analysis: Feature extraction, Region Features, Shape and Size features, Texture Analysis, Template Matching and Classification, 3D Machine Vision Techniques, Decision Making.

UNIT IV COMPUTER VISION 12

Computer Vision: Imaging Geometry, Coordinate transformation and geometric warping for image registration, Hough transforms and other simple object recognition methods, Shape correspondence and shape matching, Principal Component Analysis, Shape priors for recognition.

UNIT V CASE STUDY 12

Machine vision applications: Machine vision applications in manufacturing, electronics, printing, pharmaceutical, textile, applications in non-visible spectrum, metrology and gauging, OCR and OCV, vision guided robotics, Field and Service Applications, Agricultural, and Bio medical field, augmented reality, surveillance, bio-metrics.

TOTAL: 60 Hours

Books for Study

1. Beyerer j , “Machine Vision Automated Visual Inspection Theory Practice And Applications”, SPRINGER,ISBN - 9783662477939 ,2015
2. Sonka M., “Image Processing and Machine Vision”, Prentice Hall, , 3rd ed. 2013
3. Rafael C.Gonzales, Richard.E.Woods, “Digital Image Processing Publishers”, Third Edition, 2007
4. Alexander Hornberg, “Handbook of Machine Vision”, First Edition,2006.

5. Gonzalez, R.C., and Woods, R.E., "Digital Image Processing ", Dorling Kingsley 2009, 3rd edition.

References:

1. Jain A.K., "Fundamentals of Digital Image Processing" , Prentice Hall , 2007.
2. Emanuele Trucco, Alessandro Verri, "Introductory Techniques For 3D Computer Vision", First Edition, 2009.
3. D. Forsyth and J. Ponce, "Computer Vision - A modern approach", Prentice Hall.

Course Objective: To explore, design, and implement basic concepts of big data & analytics methodologies for analyzing structured and unstructured data with emphasis on the relationship between the Data Scientist and its application to the business needs.

Course Outcomes:

CO-1: Understand the fundamental concepts of big data platform and know about the basic concepts of nature and evolution of big data.

CO-2: To work with big data platform learn intelligent data analysis and compare old and modern data analytic tool.

CO-3: Understand the data streams concepts and stream computing.

CO-4: To explore on Big Data real time analytics platform applications.

CO-5: Learn about the advanced analytics techniques to gain knowledge of latest techniques.

CO-6: To understand the k means, naïve, decision tree, time series and text analysis.

CO-7: Learn the fundamental concepts like history and components of Hadoop.

CO-8: Become skilled at analyzing, scaling and streaming of Hadoop.

CO-9: Understand the framework of Visual data analysis techniques, interaction techniques.

CO-10: To learn tips and tricks for Big Data system and application case studies.

UNIT I INTRODUCTION TO BIG DATA 12

Introduction to Big Data Platform – Challenges of Conventional Systems - Nature of Data- Evolution Of Analytic Scalability - Intelligent data analysis- Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools

UNIT II MINING DATA STREAMS 12

Introduction to Streams Concepts – Stream Data Model and Architecture - Stream Computing -Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream –Real time Analytics Platform (RTAP) Applications

UNIT III ADVANCED ANALYTICS 12

Analyzing, Visualization and Exploring the Data, Statistics for Model Building and

Evaluation, Advanced Analytics - K-means clustering, Association rules-Speedup, Linear Regression, Logistic Regression, Naïve Bayes, Decision Trees, Time Series Analysis, Text Analysis

UNIT IV HADOOP AND FRAMEWORKS **12**

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop - Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming - Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT V CASE STUDY **12**

Case study : walmart - uber – Netflix – eBay - :Procter and Gamble – Travel and Tourism – Telecom Industry.

TOTAL: 60 Hours

Text Books for References:

1. Maheswari, “ Data Analytics”,McGraw Hill, 1 st Edition, 2017.
2. Stephan Kudyba, Big Data, Mining, and Analytics: Components of Strategic Decision Making, Auerbach Publications, March 12, 2014.
3. Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author), Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley Publications, 2013.

STATISTICAL ANALYSIS SYSTEM/SPSS PROGRAMMING 4 0 0 4

Course Objectives: The goal of the course is to increase knowledge and requisite skills of participants on the use of SPSS and to enable them make the most of this powerful software package while allowing them to work independently with SPSS on their own data and provide a solid foundation for data analysis work.

Course Outcomes:

CO1:Read raw input files in various formats and create SAS datasets.

CO2: Create new variables from other data.

CO3:Use basic SAS procedures to describe data numerically and graphically.

CO4: Annotate SAS output with titles, labels, and formats.

CO5: Work with SAS datasets: sort, subset, merge, and re-format SAS datasets

CO6:To be able to perform a wide range of data management tasks in SPSS application

CO7:To Understand the basic workings of SPSS, and perform basic statistical analyses.

CO8:To perform database management tasks, descriptive statistics and graphics, and basic inferential statistics for comparisons and correlations

CO9:To perform data checking and create simple tables and charts.

CO10: To perform advanced analysis in SPSSfor analyzing project data for reporting purposes

Unit I INTRODUCTION 12

Introduction to SAS-Reading Raw data from External files-Creating SAS Dataset-Creating Labels and Formats-Reading and Writing from Data Excel.

Unit II CONDITIONAL PROCESSING 12

Performing Conditional Processing-Performing Iterative processing-Working with Dates-Working with Numeric Functions- Working with Character functions-Working with Arrays.

Unit III DATA HANDLING 12

Data Handling-Creating New Variables-Univariate Analysis-Comparing Similar Variables-Multivariate Statistics-Tables-Linear Regression-Non-Linear Regression.

Unit IV FORMATTING AND EDITING 12

Comparative Analysis-Formatting and Editing Output-Reading ASCII Text data-Merging
Adding cases and variables.

Unit V SPSS

12

Non-Parametric testing-Reading Data from Database Formats-Time Series Analysis-SPSS
Scripts-SPSS Syntax- Graphs: More value with SAS. Case Studies: Multiple Linear
Regression: Temperatures in America and Cleaning Cars

Total: 60 Hours

Text Books:

1. SAS for Dummies-Chris Hemedinger, Stephen McDaniel, Wiley Publishing
Incorporation,2010.
2. SPSS for Beginners-Vijay Gupta-VJ Books Incorporation-2000.
3. A Handbook of Statistical Analysis using SPSS-Sabine Landau and Brian S. Everitt –
Chapman & Hall/CRC-2004.
4. Learning SAS by Example-A Programmer's Guide-Second Edition-Ron Cody-SAS
Institute Incorporation, NC, USA, 2018.

Course Objective:

This lab familiarize yourself with basic statistical concepts by examining variable types in a dataset and carrying out a graphical data exploration with SPSS. To acquaint yourself with the statistical concepts of variables, data sets, and distributions.

- 1) Variable Types and Graphical Data Exploration
- 2) Descriptive Statistics and Frequencies, Scatter plots and Correlation
- 3) Sampling and Probability Distributions
- 4) Worksheet: Probability Work Session
- 5) Sampling distribution of the sample mean and the Central Limit Theorem
- 6) Illustrating Confidence Intervals for the Population Mean
- 7) Inference for Population Means
- 8) Inference for Population Means II
- 9) Work Session for Inference on Proportions and Means
- 10) Frequency Tables and By Group Analysis
- 11) Simple and Multiple Linear Regressions
- 12) One-Way Analysis of Variance (ANOVA)

Clustering links based on required attributes. Web as a graph, identifying nodes, edges, in-degree, out-degree, HITS Algorithm Page Rank algorithm.

Unit IV WEB CONTENT MINING 12

Storing web content as text, database, various document types, generating meta-information of web documents, labelling,-tagging, identifying feature sets. Representing web documents, Vector Space Model.TF-IDF, web-page summarization, tokenization, n-gram analysis, Categorizing web pages based on required attributes, Clustering web pages based on required attributes.

Unit V CONTENT-BASED RECOMMENDATION 12

High level architecture of content-based systems, Advantages and drawbacks of content based filtering, Item profiles, Discovering features of documents, Obtaining item features from tags, Representing item profiles, Methods for learning user profiles, Similarity based retrieval, Classification algorithms.

Total: 60 Hours

Text Books:

1. Bing Liu, Web Data Mining: Exploring Hyperlinks, Content, and Usage Data, 2nd Edition, Springer, 2011
2. SoumenChakrabarti, Mining the Web, Morgan-Kaufmann, first edition, 2002
3. Jannach D., Zanker M. and FelFering A., Recommender Systems: An Introduction, Cambridge University Press(2011), 1sted.

Web Resources:

<https://www.kdnuggets.com/2014/09/most-viewed-web-mining-lectures-videlectures.html>

Weblinks:

<https://www.cs.uic.edu/~liub/WebContentMining.html>

Course Objectives: The objective of this course is to provide comprehensive knowledge of python programming paradigms required for Data Science.

Course Outcomes:

CO1: To demonstrate the use of built-in objects of Python

CO2: To demonstrate significant experience with python program development Environment

CO3: To implement numerical programming, data handling through NumPy Modules.

CO4: To Visualize through Matplotlib modules.

CO5: To Import data sets

CO6: To Clean and prepare data for analysis

CO7: To Manipulate Pandas Data Frame

CO8: To Summarize Data

CO9: To Build Machine Learning models using Scikit-Learn

CO10: To Build Data pipelines

Unit-1 INTRODUCTION TO PYTHON 12

Structure of Python Program-Underlying mechanism of Module Execution-Branching and Looping- Problem Solving Using Branches and Loops-Functions - Lists and Mutability-Problem Solving Using Lists and Functions.

Unit-2 SEQUENCE DATATYPES AND OBJECT-ORIENTED PROGRAMMING 12

Sequences, Mapping and Sets- Dictionaries- -Classes: Classes and Instances-Inheritance-Exceptional Handling-Introduction to Regular Expressions using “re” module.

Unit-3 USING NUMPY 12

Basics of NumPy-Computation on NumPy-Aggregations-Computation on Arrays-Comparisons, Masks and Boolean Arrays-Fancy Indexing-Sorting Arrays-Structured Data:NumPy’s Structured Array.

Unit-4 DATA MANIPULATION WITH PANDAS – I 12

Introduction to Pandas Objects-Data indexing and Selection-Operating on Data in Pandas-Handling Missing Data-Hierarchical Indexing - Combining Data Sets.

Unit-5 DATA MANIPULATION WITH PANDAS –II AND CASE STUDY**12**

Aggregation and Grouping-Pivot Tables-Vectorized String Operations -Working with TimeSeries-High Performance Pandas-eval() and query()- VISUALIZATION AND MATPLOTLIB:Basic functions of matplotlib-Simple Line Plot, Scatter Plot-Density and Contour Plots-Histograms, Binnings and Density-Customizing Plot Legends, Colour Bars-Three-Dimensional Plotting in Matplotlib. Case Study : Data Science in Pharmaceutical Industries, Bio Tech, and Education.

Total : 60 Hrs**Text Books:**

1. Jake VanderPlas ,Python Data Science Handbook - Essential Tools for Working with Data, O'ReilyMedia,Inc, 2016.
2. Zhang.Y ,An Introduction to Python and Computer Programming, Springer Publications,2016.
3. Joel Grus ,Data Science from Scratch First Principles with Python, O'Reilly Media,2016.
4. T.R.Padmanabhan, Programming with Python,Springer Publications,2016.

Course Objective:

The main goal of this course is to help students learn, understand, and practice big data analytics and machinelearning approaches for data science. The students implements Algorithms such as Decision trees, SVM, KNN, Naïve Bayes.

1. Functions in Python Libraries usingNumpy.
2. Functions in Python Library using Pandas.
3. Functions in Python Library usingScikit
4. Perform Data exploration and preprocessing in Python
5. Implement regularised Linear regression
6. Implement Naive Bayes classifier for dataset stored as CSV file.
7. Implement regularized logistic regression
8. Build models using different Ensembling techniques
9. Build models using Decision trees
10. Build model using SVM with different kernels
11. Implement K-NN algorithm to classify a dataset.
12. Build model to perform Clustering using K-means after applying PCA and determining the value of K using Elbow method.

Syllabus
Discipline Specific
Electives

Course Objective:

This course introduces the basic concepts of mobile computing, communication systems, mobile and wireless devices, GSM – Architecture – Routing Strategies –TCP.

Course Outcomes:

- CO-1:** Introduce various wireless systems and standards and their basic operation cases.
- CO-2:** Learn to model radio signal propagation issues and analyze their impact on communication system performance.
- CO-3:** To understand how the various signal processing and coding techniques of GSM and its Architecture.
- CO-4:** To understand the techniques of radio spectrum allocation in multi-user systems and their impact on networks capacity.
- CO-5:** To have depth knowledge about various wireless LAN techniques.
- CO-6:** To learn to simulate wireless networks and analyze the simulation results.
- CO-7:** To appreciate the contribution of Wireless Communication networks to overall technological growth.
- CO-8:** To understand the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.
- CO-9:** To provide the student with an understanding of advanced multiple access techniques
- CO-10:** To provide the student with an understanding of diversity reception techniques

UNIT I INTRODUCTION

12

Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmissions –Multiplexing – Spread Spectrum and Cellular Systems- Medium Access Control – Comparisons.

UNIT II TELECOMMUNICATION SYSTEMS

12

GSM – Architecture – Sessions –Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems - Types of Satellite System - Routing- Localization.

UNIT III WIRELESS LAN**12**

IEEE S02.11: System Architecture-Protocol Architecture, Physical Layer, 802.11b and 802.11a–
Hiper LAN: WATM, BRAN, HYPERLAN2 – Bluetooth: User Scenarios, Architecture, Radio Layer,
Base band Layer, Link Manager Protocol, L2CAP, Security, SDP – Security and Link Management.

UNIT IV MOBILE NETWORK LAYER**12**

Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse
Tunneling – Adhoc Networks – Routing Strategies.

UNIT V MOBILE TRANSPORT LAYER**12**

Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping –
Mobile – Transaction oriented TCP - TCP over wireless – Performance - Case study analysis: Smart
Phone Enhanced Shopping, Advances on Sensors for Health Systems.

TOTAL: 60 Hours**Books for References:**

1. J. Schiller , “Mobile Communications”, Pearson Education, Delhi, 2nd edition,2013.
2. Principles of Mobile Computing, Hansmann, Merk, Nicklous, Stober,2nd Edition, Springer
India), 2004.
3. Principle of wireless Networks: A unified Approach, Pahalavan, Krishnamurthy, Pearson
Education, Delhi, 2003.
4. Mobile and Wireless Design Essentials, Martyn Mallick,WileyDreamtech India Pvt. Ltd.,
New Delhi, 2004.
5. Wireless Communications and Networks, W.Stallings, 2 nd Edition, Pearson Education,
Delhi, 2004.

Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT III HASH FUNCTIONS AND DIGITAL SIGNATURES 12

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature & authentication Protocols.

UNIT IV SECURITY PRACTICE & SYSTEM SECURITY 12

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems.

UNIT V CASE STUDY ON E-MAIL, IP & WEB SECURITY 12

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy - authentication of the source - Message Integrity - Non-repudiation - Pretty Good Privacy - S/MIME. IPSecurity: Overview of IPsec - IP and IPv6 - Authentication Header - Encapsulation Security Payload (ESP) - Web Security: SSL/TLS Basic Protocol-computing the keys - Encoding-Secure Electronic Transaction (SET).

Total: 60 Hours

Books for References:

1. William Stallings, Cryptography and Network Security, 6th Edition, Pearson Education, March 2013.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, “Network Security”, Prentice Hall of India, 2002.
3. Bernard Menezes, “Network Security and Cryptography”, Cengage Learning, India Edition, 2010.
4. Behrouz A. Forouzan, Debdeep Mukhopadhyay, “Cryptography and Network Security”, Tata McGraw Hill Second Edition, 2010.

Course Objective: This course introduces the basic concepts of Data Mining and Warehousing. It gives in depth knowledge of data modelling strategy, Data Mining Algorithms, Knowledge Discovery in databases and web mining and the utilization of data warehousing.

Course Outcomes:

CO-1: To learn basics of decision data warehouse and data mining algorithms.

CO-2: To understand basic terms of data mining and algorithms to apply for real world business peoples.

CO-3: Install weka tool and apply the attributes in the existing algorithms and check the results.

CO-4: Discover interesting patterns from large amounts of data to analyze and extract patterns to solve problems and make predictions of outcomes.

CO-5: Select and apply proper data mining algorithms to build analytical applications.

CO-6: To understand basic terms of data mining and algorithms to apply for real world business peoples.

CO-7: To understand basic data warehouse structure and to learn how to gather and analyze large sets of data to gain useful business understanding.

CO-8: To learn the concept of database technology evolutionary path which has led to the need for data mining and its applications.

CO-9: To study about various data modeling strategy and create multi dimensional models.

CO-10: Design effective tools for data warehousing extract sample and realistic data.

UNIT I FUNDAMENTALS

12

DATA PROCESSING: Data Mining – History – Strategies – Techniques – Applications – Challenges –Future- Types of Data – Data Warehouses – Data Processing – Quality Measure – OLAP – Data Mining Algorithms - Feature Extraction, Selection and construction – Missing Data and Techniques.

UNIT II WEKA TOOL

12

Introduction – Installation- Visualization – filtering- selecting attributes- other popular packages. Classification Task: Introduction – Decision trees – Naïve Bayes’ classification- Artificial Neural Networks and Support Vector Machines.

UNIT III MODEL EVALUATION TECHNIQUES

12

Accuracy Estimation- ROC-Lift Charts- Cost – Bagging and Boosting- Model Ranking Approach. ASSOCIATION RULE MINING: Concepts, Relevance, Functions of Association rule Mining – Apriori Algorithm- Strengths and Weaknesses of ARM- Applications.

UNIT IV DATA WAREHOUSING

12

Need for strategic information, Decision support system, knowledge discovery & decision making, need for data warehouse, definitions of Data warehousing and data mining, common characteristics of Data warehouse, Data Marts, Metadata, Operational versus analytical databases, trends and planning of Data warehousing.

UNIT V DEFINING BUSINESS REQUIREMENTS AND CASE STUDY

12

Defining business requirements, Data modeling strategy, Fact tables, dimensions, Star schema and other schemas, Multi dimensional data models, Data Cube presentation of fact tables, using the Data warehouse, Designing tools for Data warehouse, OLAP models and operations.

Total: 60 Hours

Books for References:

1. Shawkat Ali A B M, Saleh A. Wasimi, “Data Mining: Methods and Techniques”, Third Indian Reprint, Cengage Learning, 2010.
2. Soman K. P., ShyamDiwakar, Ajay V. “Insight into Data Mining Theory and Practice” , Fifth Printing, PHI Learning, 2011.
3. <https://www.cs.waikato.ac.nz/ml/weka/citing.html>
4. Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber, the Morgan Kaufmann Series in Data Management Systems, 3rd Edition, 2012.
5. Introduction to Data Mining, Michael Steinbach, Pang-Ning Tan, and Vipin Kumar, Pearson publication, 2nd Edition, 2016.
6. Data Warehousing Fundamentals , Paulraj Ponnian, John Wiley, 3rd Edition, 2004.
7. Introduction to Business Intelligence and Data Warehousing, PHI, 2002.

CLOUD COMPUTING

4 0 0 4

Course Objective: This course introduces the fundamental concepts of cloud computing, its services and Tools. Analyze the comparative advantages and disadvantages of cloud computing.

Course Outcomes:

CO-1: To provide students with the fundamentals and essentials of Cloud Computing.

CO-2: Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing

CO-3: Identify the appropriate cloud services for a given application.

CO-4: Analyze Cloud infrastructure including Google Cloud and Amazon Cloud

CO-5: Understand the importance of protocols and standards in computing.

CO-6: Analyze authentication, confidentiality and privacy issues in cloud computing environment.

CO-7: Explore online scheduling such as Event management and project management.

CO-8: Access the cloud database, analyze how to store and share data with privacy.

CO-9: Collaborate cloud with social network and web based communication.

CO-10: Determine financial and technological implications for selecting cloud computing platforms.

UNIT I CLOUD COMPUTING

12

History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II WEB-BASED APPLICATION

12

Pros and Cons of Cloud Service Development – Types of Cloud Service Development– Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds.

UNIT III CENTRALIZING EMAIL COMMUNICATIONS

12

Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events for the Corporation

UNIT IV COLLABORATING ON CALENDARS SCHEDULES AND TASK MANAGEMENT

12

Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases– Storing and Sharing Files.

UNIT V COLLABORATING VIA WEB-BASED COMMUNICATION TOOLS 12

Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis.

Total: 60 Hours

Books for References:

1. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.
2. Haley Beard, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Pty Limited, July 2008.

Course Objective:

This course covers the technical aspects of public distributed ledgers, blockchain systems, cryptocurrencies, and smart contracts. Students will learn how these systems are built, how to interact with them, how to design and build secure distributed applications.

Course Outcomes:

- CO-1:** Stating blockchain technologies basics are made possible through learning Distributed Database and various types of database
- CO-2:** Testing the essential part for blockchain technologies starts from Cryptographical techniques, which provides a platform for students to understand the terminologies behind blockchain.
- CO-3:** Stating the Mining strategies followed in blockchain teach the basic architecture behind the perfect building of blockchain for industries.
- CO-4:** Listing the policy for creating blockchain and life of blockchain are learned as a basic necessary step in building a blockchain technologies.
- CO-5:** Classifying the limitations and proofs are another essential part of blockchain technologies, which are learned for betterment of creating blockchain.
- CO-6:** Describing the history behind the blockchain and learning about Vulnerability, Attacks and Sidechain gives an additional support for creating a secured blockchain.
- CO-7:** Recognizing some of latest cryptocurrency aspects leads students to understand some of basic concepts of Black Market and Global Economy
- CO-8:** Implementing blockchain technologies in some of real time applications are also learned
- CO-9:** Develop the acquired knowledge in solving the problem in existing case studies.
- CO-10:** Design a method for solving a problem case study with different perspective.

UNIT- I**BLOCKCHAIN BASICS****12**

Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof positions.

UNIT- II**INTRODUCTION TO BLOCKCHAIN****12**

Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain

Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain.

UNIT-III DISTRIBUTED CONSENSUS AND CRYPTOCURRENCY 12

Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate. History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin.

UNIT-IV CRYPTOCURRENCY REGULATION 12

Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy. Applications: Internet of Things, Medical Record Management System, Domain Name Service and future of Blockchain.

UNIT V CASE STUDY ON BLOCKCHAIN 12

Case study on Naive Blockchain construction, Memory Hard algorithm – Hashcash implementation, Direct Acyclic Graph, Play with Go-ethereum, Smart Contract Construction, Toy application using Blockchain, Mining puzzles

Total: 60 Hours

BOOKS FOR STUDY:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).
2. Draft version of “S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, ‘Blockchain Technology: Cryptocurrency and Applications’, Oxford University Press, 2019.
3. Josh Thompson, ‘Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming’, Create Space Independent Publishing Platform, 2017.

WEB RESOURCES:

1. <https://www.blockchainexpert.uk/book/blockchain-book.pdf>
2. https://users.cs.fiu.edu/~prabakar/cen5079/Common/textbooks/Mastering_Blockchain_2nd_Edition.pdf
3. https://www.gsb.stanford.edu/sites/gsb/files/publication-pdf/study-blockchain-impact-moving-beyond-hype_0.pdf
4. https://www.lopp.net/pdf/princeton_bitcoin_book.pdf

5. <https://bitcoinbook.cs.princeton.edu/>
6. <https://www.icaew.com/technical/technology/blockchain/blockchain-articles/blockchain-case-studies#asset>
7. <https://consensys.net/blockchain-use-cases/>
8. https://medium.com/@dejanjovanovic_24152/blockchain-case-studies-2271d37d3ed

COURSE OBJECTIVES:

This course introduces the basic concepts and types of NoSQL Databases and also gives the understanding of the detailed architecture, define objects, load data, query data of the Column-Oriented and Document Oriented NoSQL databases.

COURSE OUTCOMES:

CO-1:To know the History and Overview of NoSQL databases.

CO-2: To understand the basic concept and types of NoSQL.

CO-3: To understand the difference between RDBMS and NoSQL.

CO-4: To know the approaches of RDBMS and NoSQL.

CO-5: To understand the concepts of Sharding and Replication.

CO-6: To know the types of Sharding and Replication in server.

CO-7:To clarify the concepts of Key-Value and Document Oriented Databases using MongoDB.

CO-8: To know about the concepts of Column Oriented Databases using Apache HBASE.

CO-9:To make a study on the learned concepts of NoSQL

CO-10: To enable to create NoSQL database using different bases

UNIT I INTRODUCTION TO NOSQL**12**

Overview and History of NoSQL Databases, Definition of the Four Types of NoSQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of NoSQL, Key Points.

UNIT II NOSQL AND RELATIONAL DATABASE**12**

Comparison of relational databases to new NoSQL stores, MongoDB, Cassandra, HBASE, Neo4j use and deployment, Application, RDBMS approach, Challenges NoSQL approach, Key-Value and Document Data Models, Column-Family Stores, Aggregate-Oriented Databases.

UNIT III REPLICATON AND SHARDING**12**

Replication and sharding, MapReduce on databases. Distribution Models, Single Server, Sharding, Master- Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication.

UNIT IV NOSQL KEY/VALUE& COLUMN - ORIENTED DATABASES 12

NoSQL Key/Value databases using MongoDB, Document Databases, Features, Consistency, Transactions, Availability, Query Features, Scaling, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure. Column-oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, Column-Family Data Store, Features, Consistency, Transactions, Availability, Query Features, Scaling.

UNIT V CASE STUDY 12

A study on emergence of NoSQL- A study on uses of Relational database over NoSQL- A study on Replication and sharding – A study on Column-oriented NoSQL databases using Apache casendra– A study on MongoDB with NoSQL

Total Hours: 60

Text Books:

1. NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Sadalage, P. & Fowler, Publication: Pearson Education

Reference Book:

1. Redmond, E. & Wilson, Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement Edition: 1st Edition.

SECURITY ISSUES IN MACHINE LEARNING

Course Objective:

This course introduces the basic concept of machine learning, types of machine learning, security issues and possible solutions to ensure machine learning security, advanced learning techniques and case study on machine learning.

Course Outcomes:

- CO-1:** To understand the concepts of machine learning.
- CO-2:** To appreciate supervised and unsupervised learning and their applications
- CO-3:** To understand the classification and regression algorithm techniques.
- CO-4:** To understand the analysis of time series and overview of deep learning.
- CO-5:** To appreciate the concepts and algorithms of reinforcement learning
- CO-6:** To understand the security issues in machine learning.
- CO-7:** To understand the possible solutions to ensure machine learning security.
- CO-8:** To learn aspects of computational learning theory.
- CO-9:** To appreciate the concepts and algorithms of reinforcement learning
- CO-10:** To learn possible case studies in machine learning

UNIT I INTRODUCTION TO MACHINE LEARNING

12

Overview of Machine learning concepts – Over fitting and train/test splits, Types of Machine learning – Supervised, Unsupervised, Reinforced learning, Introduction to Bayes Theorem, Linear Regression-model assumptions, regularization (lasso, ridge, elastic net)

UNIT II CLASSIFICATION AND REGRESSION ALGORITHMS

12

Classification and Regression algorithms- Naïve Bayes, K-Nearest Neighbors, logistic regression, support vector machines (SVM), decision trees, and random forest, Classification Errors, Analysis of Time Series- Linear Systems Analysis, Nonlinear Dynamics, Rule Induction, Neural Networks Learning And Generalization, Overview of Deep Learning.

UNIT III SECURITY IN MACHINE LEARNING

12

Security Vulnerabilities in Machine Learning Algorithms, Evasion Attacks (Adversarial Inputs), Data Poisoning Attacks, Model Stealing Techniques, Possible Solutions to Ensure Machine Learning Security

UNIT IV ADVANCED LEARNING

12

Sampling-Basic Sampling methods, Monte Carlo, Gibbs Sampling – Computational Learning Theory – Mistake Bound Analysis – Reinforcement learning – Markov Decision processes, Deterministic and Non- deterministic Rewards and Actions, Temporal Difference Learning Exploration.

UNIT V CASE STUDY

12

Possible case studies: Machine learning for intrusion detection, Machine learning for side channel analysis, Privacy preserving machine learning, Adversarial machine learning.

Total: 60 Hrs

Books for References:

1. Christopher Bishop, “Pattern Recognition and Machine Learning” Springer, 2007.
2. Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press, 2012.
3. EthemAlpaydin, “Introduction to Machine Learning”, MIT Press, Third Edition, 2014.
4. Tom Mitchell, "Machine Learning", McGraw-Hill, 1997.
5. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", Springer, Second Edition, 2011.
6. Stephen Marsland, “Machine Learning - An Algorithmic Perspective”, Chapman and Hall/CRC Press, Second Edition, 2014.

MACHINE LEARNING ON CLOUD

4004

Course Objective

To familiarize the students with Computational learning basics and to implement advanced learning techniques to the cloud environment and provide security to the cloud using machine learning techniques.

Course Outcome

CO-1: Understand the types of learning and Designing a learning system.

CO-2: Apply Estimating hypothesis and could estimate Errors.

CO-3: Understand the basic sampling methods.

CO-4: Understanding about Computational learning theory.

CO-5: Apply different types of cloud technologies,

CO-6:Analyze security issues in cloud.

CO-7:Exploring Online Scheduling Applications.

CO-8:Collaborating on Project Management.

CO-9:Collaborating via Web-Based Communication Tools.

CO-10:Identify applications suitable for different types of machine learning with suitable justification.

UNIT I COMPUTATIONAL LEARNING THEORY BASICS

12

Introduction: Types of Learning - Designing a learning system – concept learning - Find-s – Candidate Elimination - PAC Learnability- Sample complexity for finite and Infinite hypothesis spaces-VC Dimension

- Evaluating Hypothesis - Estimating Hypothesis Accuracy - Error Estimation - Bias-Variance - Confidence Interval - Central Limit Theorem.

UNIT II ADVANCED LEARNING

12

Sampling – Basic sampling methods – Monte Carlo. Reinforcement Learning- K-Armed Bandit- Elements - Model-Based Learning- Value Iteration- Policy Iteration. Temporal Difference Learning- Exploration Strategies- Deterministic and Non-deterministic Rewards and Actions- Eligibility Traces- Generalization- Partially Observable States- The Setting- Example. Semi - Supervised Learning. Computational Learning Theory - Mistake bound analysis, sample complexity analysis, VC dimension. Occam learning, accuracy and confidence boosting.

UNIT III CLOUD TECHNOLOGIES

12

Infrastructure as a service: Amazon EC2 - Platform as Service: Google App Engine, Microsoft Azure Amazon AWS , Aneka – Software as a service : RESTful Web Services – SLA- Cloud Storage: MapReduce, GFS, HDFS, Hadoop Framework-Cloud container: Docker.

UNIT IV CLOUD SECURITY

12

Infrastructure Security: Network level, Host level and Application level –Data Security- Identity and access Management: Architecture and Practices - Security Management in the Cloud – Availability management- access Control.

UNIT V USING CLOUD SERVICES AND CASE STUDY

12

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files. Case Study: Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

Total: 60 Hours

Text Books:

1. Christopher Bishop, “Pattern Recognition and Machine Learning”, Springer-Verlag New York, 2013.
2. Tom M. Mitchell, “Machine Learning”, McGraw Hill, 1997.
3. RajkumarBuyya, Christian Vecchiola and ThamaraiSelviS, “Mastering Cloud Computing”, Tata McGraw Hill Education Private Limited, New Delhi, 2013.

References:

1. Yaser S. Abu Mostafa, Malik Magdon Ismail, HsuanTien Lin, “Learning From Data A Short Course”, Amlbook.Com, 2012.
2. Tim Mather, SubraKumaraswamy and ShahedLatif,“Cloud Security and Privacy: An Enterprise Perspective on Risksand Compliance”,O'Reilly, USA,2011.
3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On- demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
4. Stephen Marsland, “Machine Learning –An Algorithmic Perspective”, CRC Press, 2009

Course Objective

To enable the students to understand the Concepts of Artificial Intelligence, Search Space, Knowledge Representation, Learning Techniques, Fuzzy systems and expert systems and solve problems in Artificial Intelligence using Python.

Course Outcomes

CO-1:To gain the knowledge of fundamental concepts of Artificial Intelligence.

CO-2:Ability to understand the knowledgerepresentation, problem solving, fuzzy set and expert systems

CO-3: Ability to develop a basic understanding of AI building blocks presented in intelligent agents.

CO-4:To gain the knowledge of Heuristic Search Techniques and search methods.

CO-5:Ability to choose an appropriate problem solving method and knowledge representation technique.

CO-6: Ability to understand procedural and declarative knowledge.

CO-7:Ability to design models for reasoning with uncertainty as well as the use of unreliable information.

CO-8:Ability to design and develop the AI applications in real world scenario.

CO-9:Ability to implement search methods using Python.

CO-10:To familiarize with Fuzzy Logic and knowledge processing in expert systems.

UNIT I INTRODUCTION TO AI PROBLEMS 12

Introduction: AI Problems – AI techniques – criteria for success. The AI Problems, Defining the Problem as a State Space Search, Problem Characteristics–Searching strategies – Generate and Test, Heuristic Search Techniques–Hill climbing– issues in hill climbing.

UNIT II SEARCH METHODS 12

Search Methods – Best First Search – Implementation in Python – OR Graphs, The A* Algorithm, Problem Reduction–AND-OR Graphs, The AO* algorithm, Constraint Satisfaction. MINIMAX search procedure, Alpha–Beta pruning.

UNIT III KNOWLEDGE REPRESENTATION

12

Knowledge representation – Using Predicate logic – representing facts in logic, functions and predicates, Conversion to clause form, Resolution in propositional logic, Resolution in predicate logic, Unification.–Representing Knowledge Using Rules: Procedural Versus Declarative knowledge, Logic Programming, Forward versus Backward Reasoning.

UNIT IV LEARNING&CONNECTIONIST MODELS

12

What is learning, Rote learning, Learning by Taking Advice, Learning in Problem-solving, Learning from example: induction, Explanation-based learning.

Connectionist Models: Hopfield Networks, Learning in Neural Networks, Applications of Neural Networks, Recurrent Networks. Connectionist AI and Symbolic AI.

UNIT V CASE STUDY: EXPERT SYSTEM & PYTHON

12

Case Study: Expert System –Representing and using Domain Knowledge – Reasoning with knowledge– Expert System Shells –Support for explanation- examples –Knowledge acquisition- examples. Python–Introduction to Python– Lists Dictionaries & Tuples in Python – Python implementation of Hill Climbing.

Total : 60 hours

Books for References:

1. Konar, Amit. Artificial intelligence and soft computing: behavioral and cognitive modeling of the human brain. CRC press, 2018
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw-Hill Publishing Company Ltd., New Delhi, Third Edition, ISBN: 13:978-0-07-008770-5, 2010.
3. Stuart Russell, Peter Norvig, “Artificial Intelligence- A modern approach”, Pearson Education Asia, Second Edition, ISBN:81-297-0041-7,2009.
4. Akshar Bharati, Vineet Chaitanya, Rajeev Sangal, “Natural Language Processing: A Paninian Perspective”, Prentice Hall India Ltd., New Delhi, ISBN 10: 8120309219,2004.
5. Dan W.Patterson, “Introduction to Artificial Intelligence and Expert Systems”, Prentice Hall India Ltd., New Delhi, ISBN: 81-203-0777-1,2009.
6. Rajendra Akerkar, Introduction to Artificial Intelligence, PHI Learning Pvt.Ltd.,ISBN: 81-203- 2864-7, 2005.

Course objective

This course introduces the basic concepts of robotics, sensors, robot controls, robot cell design, and micro robotics and Nano robotics system.

Course Outcome

CO-1: To understand the basics of robot like accuracy, speed of robot, joint and links in robots.

CO-2: Explains Hydraulic, Pneumatic and Electric system and architecture of robotic system.

CO-3: To understand the purpose of end effectors like magnetic grippers, vacuum grippers and gripper design.

CO-4: To understand the purpose of robot controls like point to point control, path control and control system for robot joint.

CO-5: To analyze robot transformations like 2D, 3D, scaling, rotation and translation.

CO-6: Explains various sensors like touch sensors, tactile sensor, vision sensors, light and pressure sensors which are used in robots.

CO-7: Effectively discuss safety monitoring device in robot and actuation using

Matlab. **CO-8:** Explains robot applications like Material handling, Machine loading and unloading,

assembly, Inspection, Welding, Spray painting and undersea robot.

CO-9: Effectively discuss Actuators of Micro/Nano robotic system.

CO-10: Explains communication techniques, grippers and various types of Nano robots.

UNIT I INTRODUCTION**12**

Robot anatomy – Definition - law of robotics - History and Terminology of Robotics- Accuracy and repeatability of Robotics - Simple problems - Specifications of Robot - Speed of Robot - Robot joints and links - Robot classifications - Architecture of robotic systems- Robot Drive systems - Hydraulic, Pneumatic and Electric system.

UNIT II END EFFECTORS AND ROBOT CONTROLS**12**

Mechanical grippers-Slider crank mechanism, Screw type, Rotary actuators, cam type- Magnetic grippers - Vacuum grippers - Air operated grippers-Gripper force analysis - Gripper design - Simple problems - Robot controls - Point to point control, Continuous path

control, Intelligent robot - Control system for robot joint - Control actions - Feedback devices - Encoder, Resolver, LVDT - Motion Interpolations - Adaptive control.

UNIT III ROBOT TRANSFORMATIONS AND SENSORS 12

Robot kinematics-Types- 2D, 3D Transformation-Scaling, Rotation, Translation - Homogeneous coordinates, multiple transformation - Simple problems. Sensors in robot – Touch sensors - Tactile sensor – Proximity and range sensors – Robotic vision sensor - Force sensor - Light sensors, Pressure sensors.

UNIT IV ROBOT CELL DESIGN AND APPLICATIONS 12

Robot work cell design and control - Sequence control, Operator interface, Safety monitoring devices in Robot - Mobile robot working principle, actuation using MATLAB, NXT Software Introductions - Robot applications - Material handling - Machine loading and unloading, assembly, Inspection, Welding, Spray painting and undersea robot.

UNIT V MICRO/NANO ROBOTICS SYSTEM AND CASE STUDY 12

Micro/Nanorobotics system overview - Scaling effect - Top down and bottom up approach - Actuators of Micro / Nano robotics system - Nano robot communication techniques – Case Study : Fabrication of micro / nano grippers - Wall climbing, micro robot working principles - Biomimetic robot - Swarm robot - Nano robot in targeted drug delivery system.

Total Hours: 60 hours

Text Books:

1. S.R. Deb, “Robotics Technology and flexible automation”, Tata McGraw-Hill Education, 2009.
2. Mikell P Groover & Nicholas G Odrey, Mitchel Weiss, Roger N Nagel, Ashish Dutta, “Industrial Robotics, Technology programming and Applications”, McGraw Hill, 2012.

Reference Books:

1. Richard D. Klafter, Thomas .A, Chri Elewski, Michael Negin, “Robotics Engineering an Integrated Approach”, PHI Learning, 2009.
2. Francis N. Nagy, Andras Siegler, “Engineering foundation of Robotics”, Prentice Hall Inc., 1987.
3. P.A. Janaki Raman, “Robotics and Image Processing an Introduction”, Tata McGraw Hill Publishing company Ltd.,1995.

Syllabus

Generic Electives

Course Objective:

To build web applications using HTML and client side script technologies use with Microsoft's IIS. To build web applications with style sheets and Data object in order to provide secure web design

Course Outcomes:

CO-1: To execute HTML basic commands for programming.

CO-2: To explore different web server scripting techniques

CO-3: To explore functions of HTML

CO-4: To understand the Scripting functions.

CO-5: To understand the concepts of web designing

CO-6: To understand the web application programs

CO-7: To create a web page

CO-8: To work with multiple applications

CO-9: To understand the concepts of connecting and MySQL.

CO-10: To be well versed in creating a web application using HTML

UNIT I INTRODUCTION**6**

Internet Basic - Introduction To HTML - List - Creating Table - Linking Document Frames - Graphics To HTML Doc - Style Sheet - Style Sheet Basic - Add Style To Document - Creating Style Sheet Rules - Style Sheet Properties - Font - Text - List - Color And Background Color - Box - Display Properties.

UNIT II JAVASCRIPT FUNDAMENTALS**6**

Introduction To Javascript - Advantage Of Javascript Javascript Syntax - Datatype - Variable - Array - Operator And Expression - Looping Constructor - Function - Dialog Box.

UNIT III OBJECTS IN JAVASCRIPT**6**

Javascript Document Object Model - Introduction - Object In HTML - Event Handling - Window Object - Document Object - Browser Object - Form Object - Navigator Object Screen Object - Build In Object - User Defined Object - Cookies.

UNIT IV ASP.NET FUNDAMENTALS**6**

Asp. Net Language Structure - Page Structure - Page Event, Properties & Compiler Directives. Html Server Controls - Anchor, Tables, Forms, Files. Basic Web Server Controls- L.Able, Textbox, Button, Image, Links, Check & Radio Button, Hyperlink. Data List Web Server Controls - Check Box List, Radio Button List, Drop down List, List Box, Data Grid, Repeater.

UNIT V NETWORK & SECURITY

6

Request And Response Objects, Cookies, Working With Data - OLEDB Connection Class, Command Class, Transaction Class, Data Adaptor Class, Data Set Class. Advanced Issues - Email, Application Issues, Working with IIS and Page Directives, Error Handling. Security - Authentication, IP Address, Secure By SSL & Client Certificates.

TOTAL: 30 Hours

Books for References:

1. Web Enable Commercial Application Development Using HTML, DHTML, Javascript, P I. Bayross, en CGI, BPB Publications, 2000.
2. ASP 3 Programming Bible, Eric A. Smith, Wiley-Dreamtech India (P) Ltd, 2003.
3. ASP3.0 Beginners Guide, Dave Mercer, TataMcGraw-Hill Edition, Sixthreprint, 2004.
4. Mastering Javascript, J. Jaworski BPB Publications, 1999.
5. Complete Reference HTML (Third Edition), T. A. Powell, TMH, 2002.

Course Objective:

This course gives introduction to the concepts of ASP, VB Script and Java Script, Working with ASP.NET to enhance communication and security and to develop web page.

Course Outcomes:

CO-1: To understand client side scripting language

CO-2: To program and debug applications using a variety of client side and server side Technologies.

CO-3: To exhibit the knowledge of programming with basic building blocks of scripting language

CO-4: To develop applications by using scripting concepts

CO-5: To gain deep knowledge in different controls using client server

CO-6: To apply validation controls in developing client side scripting language

CO-7: To apply the features of all objects, caching and session management for every client.

CO-8: To authenticate web pages and to know how to develop event related with error free applications.

CO-9: To compare the functionalities of connected and disconnected architectures

CO-10: To develop applications which connects client servers using scripting language

UNIT I INTRODUCTION**6**

Introduction To` Vbscript - Adding Vbscript Code To An Html Page - Vb Script Basics - Vbscript Data Types - Vbscript Variables - Vbscript Constants -Vbscript Operators – Mathematical- Comparison-Logical - Using Conditional Statements - Looping Through Code - Vbscript Procedures – Type Casting Variables - Math Functions – Date Functions – String Functions – Other Functions - Vbscript Coding Conventions - Dictionary Object In Vbscript - Err Object.

UNIT II JAVA SCRIPT**6**

Introduction To Javascript – Advantages Of Javascript – Javascript Syntax - Data Type – Variable - Array – Operator &Expression – Looping – Control Structures - Constructor Function – User Defined Function Dialog Box .

UNIT III OBJECT MODEL**6**

Javascript Document Object Model – Introduction – Object In HTML – Event Handling – Window Object – Document Object – Browser Object – Form Object – Navigator Object – Screen Object – Build In Object – User Defined Object – Cookies.

UNIT IV ASP.NET

6

ASP.NET Language Structure – Page Structure – Page Event, Properties & Compiler Directives. HTML Server Controls – Anchor, Tables, Forms, Files. Basic Web Server Controls – Label, Text Box, Button, Image Links, Check & Radio Button, Hyperlink, Data List Web Server Controls – Check Box List. Radio Button List, Drop down List, List Box, Data Grid, Repeater.

UNIT V SECURITY

6

Request And Response Objects, Cookies, Working With Data – OLEDB Connection Class, Command Class, Transaction Class, Data Adaptor Class, Data Set Class. Advanced Issues – Email, Application Issues, Working with IIS and Page Directives, Error Handling. Security – Authentication, IP Address, Secure By SSL & Client Certificates.

TOTAL: 30 Hours

Books for References:

1. Web Enable Commercial Application Development Using HTML,DHTML,Javascript, I.Bayross ,Perl CGI, BPB Publications,2000.
- 2.Mastering Active Server Pages 3, A.Russell Jones,and BPB Publications.
3. Internet Programming with VBScript and JavaScript, Hathleen Kalata, Thomson Learning.
1. XML Harness the Power of XML in easy steps, Mike McGrath, Dreamtech Publications.
2. Complete Reference HTML, T.A. Powell, TMH, 2002.
3. Mastering Javascript, J.Jaworski, BPB Publications, 1999.

Course Objective:

To understand the fundamentals of Photoshop & can able to retouch & repair, Work with multiple layers, Slice & clone, Design basic web templates, and create animations.

Course Outcomes:

CO - 1: To understand the basics of Photoshop concepts and its advantages.

CO - 2: To understand the designing concepts

CO - 3: To implement the basics of Photoshop

CO - 4: Ability to Understand Photoshop concepts.

CO – 5: To build the designing structure of photoshop concepts of Relational Algebra.

CO – 6: Become proficient in concepts and its anomalies.

CO – 7: Gain necessary knowledge in photoshop development

CO - 8: Acquire necessary knowledge about Case study in various areas.

CO - 9: Become proficient in using Photoshop

CO - 10: To be able to design using Photoshop

UNIT I BASICS OF ADOBE PHOTOSHOP**6**

Learn The Tools And What They Do-- Basic Workflow- Creating Effective Storing- Batch Renaming- How To Save Your Photos- Digital Asset Management- File Types- File Sizes- Color Types.

UNIT II LAYERS**6**

Layer Styles-Layers Palette-Working With Layers-New Layersvia Cut-New Layers Via Copy- Hiding/Showing Layers-Repositioning Layers-Flattening Images-Working With Adjustment Layers-Layer Effects-Opacity- Adjustment Layers.

UNIT III BASIC RETOUCHING**6**

Color Manipulations- Levels- Curves- Seeing Color Accurately- Patch Tool- Cropping- Reading Your Palettes- Dust and Scratches.

UNIT IV ADVANCED RETOUCHING**6**

Smoothing Skin-Strategy for Retouching-Resolution and Image Size-Cropping and Image- Adjusting the tonal image-Removing a Color Cast- Smoothing Wrinkles- Special Color Effects: Black And White, Sepia, Grainy.

UNIT V WORKING WITH A LOT OF IMAGES

6

Cataloging Your Images- Editing Our Photoshoot- Naming Your Shoot- Automating Your Shoot- Batch Processing- Introduction to Action.

TOTAL: 30 Hours

Books for References:

1. Fundamental Photoshop, Greenberg, Tata McGraw- Hill,1995
2. Photoshop 7,The Ultimate Reference, Laurie Ann Ulrich, Dream Tech Press, 2002
3. Photoshop CS2 in Simple Steps, Shalini Gupta, Adity Gupta, Dreamtech Press, 2006.
4. Adobe Photoshop CS6 Bible, Lisa Danae Dayley, Brad Dayley,Wiley India,2012.

Course Objective:

This course provides hands-on experience with Adobe Flash, a Web-authoring and animation tool. Students gain understanding of fundamental Flash paradigms (Stage, Symbols, Library and Timeline) and Create simple, tasteful animation effects. Students use Buttons and ActionScript to enable basic user interaction.

Course Outcomes:

CO - 1: To understand the basics of Flash

CO - 2: To understand the designing concepts

CO - 3: To implement the basics of Drawing and Coloring

CO - 4: Ability to Understand Working with text and Modifying Objects

CO – 5: To build the designing structure of Working with Layers and Symbols

CO – 6: Become proficient in working with Sound and Video

CO – 7: Gain necessary knowledge in Export keyboard shortcuts as HTML

CO - 8: Acquire necessary knowledge about Filters, Effects And Layer Types

CO - 9: Become proficient in using Flash

CO - 10: To be able to Publish Profiles using animation techniques

UNIT I SYMBOLS, INSTANCES, AND THE LIBRARY**6**

Understanding the Document Library - Defining Content Types- Editing Symbols- Modifying Instance Properties -Slice Scaling for MovieClip Backgrounds - Color Basics - Working in the Swatches Panel - Using the Color Panel - Working with Droppers, Paint Bucket, and Ink Bottles.

UNIT II WORKING WITH TEXT AND GRAPHICS**6**

Text Field Types in Flash - The Text Tool and the Property Inspector - Font Export and Display - Sampling and Switching Fills and Strokes - Transforming Gradients and Bitmap Fills - Gradient Transform Used for Lighting Effects - Applying Modify Shape Menu Commands - Free Transform Commands and Options - Modifying Item Types - Using the History Pane.

UNIT III ANIMATION STRATEGIES**6**

Establishing Ground Rules -Defining Variables - Adding Personality - Manipulating Perceptions and Illusion - Understanding the Laws of Nature -Timeline Animation - Basic

methods of Flash Animation -Frame-by-Frame Animation - Modifying Multiframe Sequence - Using Tweens for Animation -Integrating Multiple Animation Sequence -Organizing Symbol Instances on the Main Timeline -Reusing and Modifying Symbol Instances - Duplicating Tweened Animation Properties with the Copy Motion Command.

UNIT IV APPLYING FILTERS, EFFECTS AND LAYER TYPES

6

Applying Filters in Flash -Controlling Color -Layering Graphics with Blend Mode -Using Timeline Effects for Graphics and Animation - Motion Guides -Mask Layers - Motion Guides and Movie Clip Masks -Using Distribute to Layers.

UNIT V CHARACTER ANIMATION TECHNIQUES

6

Working with Large File Sizes -Some Cartoon Animation Basics - Animator's Keys and In betweening -Coloring the Art -Flash Tweening-.Adding- Sound Identifying- Sound File Import and Export Formats -Importing Sounds into Flash -Assigning a Sound to a Button -Adding Sound to the Timeline.

TOTAL: 30 Hours

Books for References:

1. Adobe Flash CS3 Professional by Robert Reinhardt, Snow Dowd, 2007
2. Flash 5 for PC/MAC, Sami Ben-Yahia, ENI, 2001.
3. Flash in a Flash Web Development, Anushka Wirasinha, PHI, 2002.
4. Flash 8 ActionScript Bible, Lott, Joey, John Wiley & Sons, 2006.

Course Objective:

This course provides concepts of Advance Excel such as Financial Functions, Date and Time Functions, VLookup, Analysis Tool Pack.

Course Outcomes:

CO-1: To learn to modify Excel options

CO-2: To protect data in worksheets and workbooks

CO-3: To import data into Excel and export data from Excel

CO-4: To use data linking to create more efficient workbooks

CO-5: To group cells and use outlines to manipulate the worksheet

CO-6: To create summaries in your spreadsheets using subtotals

CO-7: To use the Data Consolidation feature to combine data from several workbooks into one

CO-8: To create, use and modify data tables

CO-9: Ability to use data linking to create more efficient workbooks

CO-10: To create recorded macros in Excel

UNIT I INTRODUCTION**6**

Understanding Excel's Files, Ribbon and Shortcut: CreateA Workbook - Enter Data In A Worksheet - Format A Worksheet - Format Numbers In A Worksheet - Create An Excel Table - Filter Data By Using An Autofilter - Sort Data By Using An Autofilter.

UNIT II DATE AND TIME**6**

Working With Dates And Times &Text: Working With Dates &Time, Creating Formulas That Manipulate Text – Upper, Proper, Lower, Concatenate, Text To Column- Creating Formulas That Count, Sum, SubTOTAL: CreateA Formula - Use A Function In A Formula - Creating Formulas That Look Up Values: Vlookup, Hlookup, Match &Index .

UNIT III FINANCIAL FUNCTIONS**6**

Creating Formulas For FINANCIAL Applications: Introduction To Formulas E.G. PV, PMT, NPER, RATE, Creating Balance Sheet, Investment Calculations, Depreciation Calculations- Creating Charts And Graphics: Chart Your Data, Creating Sparkline Graphics, Using Insert Tab Utilities.

UNIT IV FORMATTING**6**

Using Custom Number Formats:Right Click, Format Cells Window - Using Data Tab And Data Validation:Getting External Data, Remove Duplicates, Apply Data Validation & Using Utilities From Data Tab - Protecting Your Work: Using Review Tab Utilities - Performing Spreadsheet What-Lf Analysis:Create A Macro - Activate And Use An Add-In.

UNIT V ANALYSIS

6

Analyzing Data With The Analysis Tool Pack: Anova,Correlation, Covariance, Descriptive Statistics, Histogram, Random Number Generation, Rank And Percentile, Regression, T-Test, Z Test - Using Pivot Tables For Data Analysis:Create Data Base For Pivot, Analyzing Data With Pivot Tables, Producing Report With A Pivot.

TOTAL: 30 Hours

Books for References:

1. Excel 2010 Bible [With CDROM] by John Walkenbach, John Wiley & Sons, 2010.
2. Mastering Financial modeling in Microsoft excel, Day, Alastair, Pearson Education, 2nd Edition, 2007.
3. Excel 2007 for Dummies, Greg Harvey, John Wiley & Sons, 2006.
4. New Perspectives on Microsoft Office Excel 2007, June Jamrich Parsons , Dan Oja , Roy Ageloff , Patrick Carey, Course Technology; 1 edition, 2013.

STATISTICAL PACKAGE FOR SOCIAL SCIENCE 2002

Course Objective:

This course introduces concepts of Statistical Package for Social Sciences and also working with it.

Course Outcomes:

CO-1: To learn concepts of statistical population and sample, variables and attributes.

CO-2: To evaluate Tabular and graphical representation of data based on variables.

CO-3: To learn Conditions for the consistency' and criteria for the independence of data based on attributes.

CO-4: To learn Measures of central tendency, Dispersion, Skewness and Kurtosis.

CO-5: To review Moments and their use in studying various characteristics of data.

CO-6: To learn Different approaches to the theory of probability.

CO-7: To learn Important theorems on probability and their use in solving problem

CO-8: To learn Concept of correlation, various correlation coefficients

CO-9: To learn Concept of Principle of least squares for curve fitting and regression lines.

CO-10: To learn the theory of Comparison test

UNIT I INTRODUCTION

6

Brief Description And History Of SPSS - Running SPSS And The Initial Window(S) - Running SPSS - The Initial SPSS Window(S) Overview The Title Bar The Menu Bar The (Power) Tool Bar The Data Editor (Data View And Variable View) The Status Bar.

UNIT II OVERVIEW

6

Sample SPSS Session Overview Of This Exercise -Open File - List Cases - Frequencies - Explore - Graphics - Non Parametric Wilcoxon Test - Correlation -Regression.

UNIT III COMPUTATION

6

Creation Of A Small Data File And Computation Of New Variables Overview- Preliminary Considerations About Data Structures -Creation Of A Data Dictionary -Entering Data - Moving Around The Data - Editing Data - Computation Of New (Or Existing Variables) .

UNIT IV COMPARATIVE STATISTICS

6

Data Entry - Descriptive Statistics-. Examining Assumptions Of Parametric Statistics - Test For Normality- Test For Homogeneity Of Variances- Transformations-Comparative Statistics: Comparing Means Among Groups.

UNIT V COMPARISON TEST

6

Comparing Two Groups Using Parametric Statistics -Two-Sample T-Test -Paired T-Test -
Comparing Two Groups Using Non-Parametric Statistics - Mann Whitney U Test - Comparing
Three Or More Groups Using Parametric Statistics - One-Way ANOVA And Post-Hoc Tests -
Comparing Three Or More Groups Using Non-Parametric Statistics - Kruskal-Wallis Test - For
Studies With Two Independent Variables.

TOTAL: 30 Hours

Books for References:

1. Discovering Statistics Using IBM SPSS Statistics,Andy Field,SAGE Publications
Ltd, 4th edition, 2013.
2. SPSS: Stats Practically Short and Simple, Sidney Tyrrell, Bookboon, 2009
3. SPSS for you, Rajathi.A, MJP Publishers 2010.
4. SPSS for Dummies,Griffith, Arthur, John Wiley, 2007.

Course Objective:

This course introduces the basic computer concepts and various problem solving methods, including word processing, Calculations using Spreadsheet applications and Data storage using Database management.

Course Outcomes:

CO-1: Understand the Evolution of Computers.

CO-2: Analyze the Classification of Computers.

CO-3: Understand different types of Soft wares.

CO-4: Apply Knowledge of converting Doc into WWW pages.

CO-5: Apply formatting features, editing text & paragraphs.

CO-6: Automating your work and Printing documents.

CO-7: Working and editing in workbook.

CO-8: Creating formats and links.

CO-9: Finding Information in Databases and importing data from other databases.

CO-10: Creating Presentation using MS PowerPoint.

UNIT I FUNDAMENTALS OF COMPUTER**6**

Evolution Of Computers - Classification Of Computers – Definition Of Hardware- CPU – Inputs/Outputs – Storage Devices - Types Of Software - Overview of Operating System – Multitasking OS –Overview Of Modern Digital Computer.

UNIT II MS WORD**6**

Word Processing Programs And Their Uses – Word Basics – Formatting Features -Editing Text &Paragraphs- Automatic Formatting And Styles –Mail Merge–Working With Tables- Graphics And Frames – Macro - Special Features Of Word – Automating Your Work And Printing Documents- Desktop Publishing Service – Converting Doc Into Www Pages.

UNIT III MS EXCEL**6**

Spreadsheet Programs – Applications – Menus-Commands-Toolbars – Working &Editing In Workbook – Creating Formats &Links – Formatting A Worksheet &Creating Graphic Objects – Calculations – Working With Formula - Organizing Data, Importing Data, Functions – Data Handling – Working With Graphs - Creating Charts - Managing Workbooks.

UNIT IV MS ACCESS

6

Introduction - Planning A Database - Starting Access - Data Types And Properties - Creating A New Database - Creating Tables - Working With Forms - Creating Queries - Finding Information In Databases - Creating Reports - Types Of Reports - Printing & Print Preview – Importing Data From Other Databases Viz. MS Excel Etc.

UNIT V MS POWERPOINT

6

Getting Started In Powerpoint – Creating A Presentation - Setting Presentation Style - Adding Text To The Presentation - Formatting A Presentation - Adding Style, Color - Arranging Objects - Adding Header & Footer - Creating And Editing Slides – Slide Layout – Adding Picture And Graph – Adding Sound And Video – Adding Auto Shape - Custom Animation - Previewing A Slide Show.

TOTAL: 30 Hours

Books for References:

1. Computing Fundamentals & C Programming, E.Balagurusamy , Tata McGrawhill.
2. MS office 2000, Sanjay Saxena, Vikas publication house pvt.ltd.
3. Microsoft Office 2003: The Complete Reference, Jennifer AckermanKettell, Guy Hart-Davis, Curt Simmons, McGraw-Hill Osborne, 2nd edition, 2003.
4. Office Automation & Word Processing, Balaguruswamy, TMH.

Course Objective:

This course introduces the basic concepts of desk top publishing with document setup, fonts, composing machines, graphics, tones, book preparation and file maintenance.

Course Outcomes:

CO-1: Understand the basics of computers, Hardware and Software.

CO-2: Learn DOS commands and Tools.

CO-3: Understand File Downloading and Uploading.

CO-4: Apply formatting for document creation.

CO-5: Inserting special effects and images for the document.

CO-6: Learning typography.

CO-7: Designing page using graphics.

CO-8: Apply knowledge for seminar presentation.

CO-9: Understand different types of printers and file formats.

CO-10: Apply knowledge for project work preparation.

UNIT I FUNDAMENTALS OF COMPUTERS**6**

Introduction To Computers, Hardware And Software – Applications Of Computers – Input Devices – Output Devices – Storage Media – Types Of Software- Operating Systems – Introduction To DOS – DOS Commands And Tools – MS-Windows – Using The Desktop – Setup Using Control Panel – Windows Accessories – Files & Folder Management - Introduction To Internet – Browsers – Sending And Receiving E-Mail – File Downloading And Uploading.

UNIT II DOCUMENT SET UP**6**

History Of Printing – Types Of Printing - Desktop Publishing: Introduction – Merits & Demerits – DTP And Traditional Composing – Cost & Estimation Of DTP Unit – Word Processing Using MS-Word: Basics – Text Formatting – Setting Header And Footer – Tables, Borders And Shading –Special Effects And Image Insertion.

UNIT III TYPING AND COMPOSING PAGES**6**

Typography – Managing Fonts – Measurement Types For Fonts, Pages, Lines – Proof Reading – Page Setup – House Styles – Page Maker Case Study - Page Composing - Different

Composing Methods And Processes – Composing Machines – Output Devices – Qwark Express
Case Study

UNIT IV DOCUMENT DESIGNING:

6

Graphic Reproduction – Setting Tones, Shadowing, Highlight, Contrast For Images -
Scanning Principles – Types Of Scanners And Their Use – Setting Resolution – Page Design –
Color Types – Color Selection - Preparation Of Graphics – Book Preparation – Seminar
Presentation – Imposition Techniques

UNIT V FILE & PRINT MANAGEMENT:

6

Printing – Types of Printers – Different Types of File Formats – Icc Based Color
Management – Preparation Of Project Work – Binding Techniques – Coreldraw Case Study.

TOTAL: 30 Hours

Books for References:

1. Rapidex DTP Course, Shirish Chavan ,UNICORN Books Pvt. Ltd., 2007
2. A First Course in Computers,Sanjay Saxena, , Vikas Publishing House, 2005.
3. DTP Manual, Pete Yeo, Chapman Hall.
4. Rapidex DTP Course:Coreldraw – 2005, Shirih Chauan, Unicorn Books.

Course Objective:

This course introduces the basic concepts, various queries, triggers and stored routine of Mysql. It also gives the Cursor management, event management and user management of Mysql.

Course Outcomes:

CO-1: Understand the Basics of SQL.

CO-2: Analyze the difference between Relational and Non-Relational Database System.

CO-3: Apply validity checking using CONSTRAINTS.

CO-4: Understand the types of queries.

CO-5: Apply sub queries & joins for the statements.

CO-6: Understanding Simple Transaction using Commit & Rollback.

CO-7: Create And Drop a Trigger.

CO-8: Create And Invoke a Stored Routine.

CO-9: Understand MySQL cursor management and Events.

CO-10: Apply knowledge to recover from crashes.

UNIT I INTRODUCTION TO SQL BASICS**6**

Introduction: To Databases, Relational and Non-Relational Database System Mysql As A Non-Procedural Language. View of Data. SQL Basics: Statements, Names (Table & Column Names), Data Types, Creating Database, Inserting Data, Updating Data, Deleting Data, Expressions, Built-In-Functions, Missing Data CREATE, USE, ALTER, RENAME, SHOW, DESCRIBE And DROP, PRIMARY KEY FOREIGN KEY (One And More Columns) Simple Validity Checking Using CONSTRAINTS.

UNIT II SIMPLE, NESTED, SUBQUERIES**6**

Simple Queries: The SELECT Statement Multi-Table Queries: Simple Joins (INNER JOIN), SQL Considerations For Multitable Queries (Table Aliases, Qualified Column Names, All Column Selections Self Joins). Nested Queries:Using Sub Queries, Sub Query Search Conditions, Sub Queries & Joins, Nested Sub Queries, Correlated Sub Queries, Sub Queries In The HAVING Clause. Simple Transaction Illustrating START, COMMIT, and ROLLBACK.

UNIT III MYSQL TRIGGERS AND STORED ROUTINE**6**

Mysql Triggers: Basics of Trigger, Create and Drop A Trigger, Find All Triggers in Database. Mysql Stored Routine: Stored Routine, Create and Invoke A Stored Routine, Alter A Stored Routine, Drop A Stored Routine.

UNIT IV MYSQL CURSOR MANAGEMENT AND EVENTS

6

Utilize Functionalities Of Mysql Cursor: Basics Of Cursor, Defining The Cursor, Retrieve Values From Cursor, Close The Cursor. Mysql Events: Events, Turning Event Scheduler On Create The Event, Find All Events In Database, Chang The Event And Drop The Event.

UNIT V USER MANAGEMENT, BACKUP AND RECOVERY

6

User Management in MySQL: Basics of MySQL User, Access Control List, Manage User Accounts, GRANT And REVOKE Command, Reset Root Password. Backup and Recovery: Back Up Mysql, Uses for Backup, Backup Frequency, Copy Database intoanother Machine, Recovery from Crashes.

TOTAL: 30 Hours

Books for References:

1. SQL a complete reference - Alexis Leon & Mathews Leon TMG.
2. Learning MySQL - Seyed M. M. and Hugh Williams, O'REILLY.
3. PHP & MYSQL in easy steps, MCGrath, MIKE, MGH, 2012.
4. MySQL Administrator- Sheeri Cabral.

Course Objective:

The course intends to inculcate the significance of cyber space and to enlighten the various legal, social and international issues and the various remedies available under the Information Technology Act for the breach and commission of offence in cyber space. The course also outlines international best techniques and the various legal mechanisms to control the various offences in the cyberspace.

Course Outcomes:

CO-1: Define and describe the nature and scope of cybercrime.

CO-2: To introduce the cyber world and cyber law in general.

CO-3: Develop knowledge of major incidents of cybercrime and their resulting impact.

CO-4: Analyze and discuss national and global digital law enforcement efforts.

CO-5: Critically consider specific laws and policies governing cybercrime detection and prosecution.

CO-6: Identify and evaluate the specific technology that facilitates cybercrime and digital law enforcement.

CO-7: Critically evaluate the impact of cybercrime on information professions.

CO-8: To enhance the understanding of problems arising out of online transactions and provoke them to find solutions.

CO-9: To clarify the Intellectual Property issues in the cyber space and the growth and development of the law in this regard.

CO-10: To educate about the regulation of cyber space at national and international level.

UNIT I INTRODUCTION**6**

Introduction to cyber space -UNCITRAL Model Law - Information Technology Act, 2000 with recent amendments - Jurisdictional issues - Digital signatures - regulation of - certifying authorities - Cyber Regulation Appellate Tribunal – Human Rights Issues.

UNIT II ONLINE CONTRACTS**6**

Formation of online contracts - E banking transactions, online payment options, online advertising - Electronic and digital signatures - Taxation issues in cyber space- indirect tax, tax evasion, double tax, international tax, permanent establishment - Protection of trade secrets and deceptive trade practices.

UNIT III CYBER CRIMES**6**

Understanding cybercrimes - Identifying Theft and Frauds - Types of crimes in the internet: Against person, against property, against government - Digital evidence- investigation and adjudication of cybercrimes in India- cyber arbitration, cyber conflict investigation- cyber Terrorism.

UNIT IV INTELLECTUAL PROPERTY RIGHTS (IPR) AND CYBER SPACE

6

Copyright issues in the internet- protection of computer software, caching, international regime-OSS, DMCA, Data Protection Directive - Trademark issues in the internet – Domain Name Registration, Domain Name Registration, Domain Name Dispute, ICANN, UDRP policy, linking, framing, tagging - Database issues in the internet.

UNIT V THE INDIAN EVIDENCE ACT OF 1872 V. INFORMATION TECHNOLOGY ACT, 2000

6

Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages.

CASE STUDY- PROTECTION OF CYBER CONSUMERS IN INDIA:

Are Cyber Consumers Covered Under the Consumer Protection Act? Goods and Services, Consumer Complaint, Defect in Goods and Deficiency in Services, Restrictive and Unfair Trade Practices, Instances of Unfair Trade Practices, Reliefs Under CPA, Beware Consumers, Consumer Foras, Jurisdiction and Implications on cyber Consumers in India, Applicability of CPA to Manufacturers, Distributors, Retailers and Service Providers Based in Foreign Lands Whose Goods are Sold or Services Provided to a Consumer in India.

Total: 30 Hours

Books for References:

1. Computers, Internet and New Technology Laws – Karnika Seth, Cyber Lawyer and Expert and is the Managing Partner of Seth Associates, Edition 2012.
2. Legal dimensions of cyber space – S.K.Verma, Raman mittal, Indian Law Institute, New Delhi: Indian Institute, 2004.
3. Law Relating to Computers Internet & E-commerce - A Guide to Cyber laws & the Information Technology Act, Rules, Regulations and Notifications along with Latest Case Laws, 2012.
4. Cyber security Law, by Jeff Kosseff, Wiley Publications, Edition – 2017.
5. Information technology law – Ian. J. Lyod, Information Technology Act 2000, its amendment and IT Rules 2014.

6. Cyber space law commentaries and Materials- Yee fen Lim, second edition, Galexia Consulting Pty Ltd, Australia.
7. Cyber law – Yatindra Singh, The Indian Law Institute of Technology 2000.

List of Ability Enhancement Compulsory Courses

VISTAS
HINDI SYLLABUS(2020-21)
I YEAR

I year-I Sem (Prose,Letter writing& Technical words)

- Unit I - 'Mamta',letter writing,Technical words.
Aim - Through the story students will be familiar with the writing style of great writer "sri Jayashankar Prasad", &can understand the situation of country during Mughal period .
- Unit II - 'Yogyata aur vyavasaya kaa chunaav', letter writing, Technical words.
Aim - To make the children understand the importance of selecting a profession according to one's own interest.
- Unit III - 'Rajmithi kaa bantwara', letter writing,Technical words.
Aim - To describe the present situation;politician's behaviour& their selforiented activities.
- Unit IV - 'computer:nayi kranthi ki dastak',letter writing, Technical words
Aim - To explain the importance of computer in daily life in all the fields.
- Unit V - Raspriya,letter writing,Technical words
Aim - This story helps the students to understand the Writing style of writer "Fanishwarnath renu"who Is wellknown for his village type Stories .

Training the students regarding different types of letters & technical words ,this will help the students to understand the official work in Hindi.

Text Book Gadya our prayojanmulak Hindi ; Edited by Dr.N.Lavanya, Mayur Publishers
Edition :2011

VISTAS
HINDI SYLLABUS(2020-21)
I year-II Sem (kahani,Ekanki&Translation)

- Unit I** - **'Pus ki raath'(kahani), Translation**
Aim This story explains the problems faced by the farmers
'Upanyas samrat Premchand' describes the life of a poor farmer who represents present day's situation
Aim **'Das hazar'(ekanki), Translation**
Author 'Uday Shankar bhatt' criticized the rich&stingy person's behaviour and explains the importance of human values in a humorous manner
By translating the English passage into Hindi, students learn the rules which should be followed while translation.
- Unit II** - **'vaapasi'(kahani), Translation**
Aim Female writer 'Usha priyamvada' describes the mentality of a retired person in a beautiful manner
Aim **'Akhbaari vijnapan'(ekanki), Translation**
This humorous story written by 'chiranchith' points out the problems occur due to Carelessness&lack of communication.
- Unit III** - **'Akeli'(kahani), Translation**
Aim Writer 'Mannu bhandari' describes the condition of middle aged woman left lonely who longs only for love &affection¬hing else.
Aim **'Raat ke raahi', (ekanki), Translation**
'Vrajabhushan' shows the clear picture of cunning woman and creates Awareness
- Unit IV** - **'Parda'(kahani), Translation**
Aim Written by 'Yashpal', this story brings the clear picture of problems Faced by a poor muslim family.
Aim **'Maim bhi maanav huum'(ekanki), Translation**
Author 'vishnu prabhakar' describes the kalinga war&reasons behind samrat Ashok's change of mind.
- Unit V - **'Sharandata'(kahani), Translation**
Aim This story written by 'Anjeya explains the situation of Indian people who lived in Pakistan region after separation .
Aim **'Yah meri janma bhumi hai''(ekanki), Translation**
'Harikrishna premi' points out the patriotism of a british girl who Was born in India &also the country's condition at that time.

Text book : sankalan kahani our ekaanki ; Edited by Dr,N.Lavanya ,
Mayur Publishers- Edition :2010

VELS INSTITUTE SCIENCE, TECHNOLOGY & ADVANCED STUDIES
VELS UNIVERSITY
PALLAVARAM-CHENNAI-600117

SYLLABUS
FOR THE I YEAR & I SEMESTER COMMON TO ALL UG PROGRAMMES
EFFECTIVE FROM ACADEMIC YEAR
2017-2018.

SUB CODE:15LFR001 FRENCH I

5004

OBJECTIVE:

To introduce French language.

To enable the students to understand and to acquire the basic knowledge of French language with elementary grammar.

UNIT:I INTRODUCTION

12

Introduction-Alphabet-comment prononcer, écrire et lire les mots-base: les prénoms personnel de 1er , 2eme et 3eme personnes-conjugaisons les verbes être et avoir en forme affirmative, négative

Et interrogative.

UNIT II- LECON 1-3

12

Leçon 1 :Premiers mots en français- 2.Les hommes sont difficiles 3.Vive la liberté-Réponses aux questions tirées de la leçon-Grammaire: Les adjectives masculines ou féminines-Les article définies et indéfinis-Singuliers et pluriels.

UNIT III-LECON 4-6

12

Leçons 4. L'heure c'est l'heure 5.Elle va revoir sa Normandie 6.Mettez-vous d'accord groupe de nom-Réponses aux questions tirées de la leçon-Grammaire :A placer et accorder l'adjectif en groupe de nom-Préposition de lieu-A écrire les nombres et l'heure en français

UNIT :IV-LECON 7-9

12

Leçon 7.Trois visages de l'aventure , 8. A moi Auvergne 9.Recit de voyage-Réponses aux questions tirées de la leçon- Grammaire : Adjectif processif- Les phrases au présent de l'indicatif-Les phrases avec les verbes pronominaux au présent.

UNIT :V- COMPOSITION :

12

A écrire une lettre à un ami l'invitant à une célébration différente ex :mariage-A faire le dialogue- A lire le passage et répondre aux questions.

TEXTBOOK :

Jack GIRARDER & Jean Marie GRIDLIG,<<Méthode de Français PANORAMA>>, Clé Internationale, Goyal Publication ,New Delhi Edition 2014.

REFERENCE BOOKS:

DONDO Mathurin, "Modern French Course", Oxford University Press, New Delhi Edition 2014.

Nithya Vijayakumar get ready French grammar-Elementary Goyal publications ,New Delhi Edition 2014.

**VELS INSTITUTE SCIENCE, TECHNOLOGY & ADVANCED STUDIES
VELS UNIVERSITY
PALLAVARAM-CHENNAI-600117**

**SYLLABUS
FOR THE I YEAR & II SEMESTER COMMON TO ALL UG PROGRAMMES
EFFECTIVE FROM ACADEMIC YEAR
2017-2018.**

SUB CODE:15LFR002 FRENCH II

5004

OBJECTIVE:

To fortify the grammar and vocabulary skills of the students.

To enable the students have an idea of the French culture and civilization

UNIT:I LECON 10-11

12

Leçons :10 Les affaires marchent,11 un repas midi a problèmes- Réponses aux questions tires de la leçon-grammaire ;présent progressif passe récent ou future proche-complément d'Object directe-complément d'objet

UNIT II- LECON 12-13

12

Leçons 12 :tout est bien qui fini bien,-13 aux armes citoyens-réponses aux questions tires de la leçon-grammaire :les pronoms<<en ou y>> rapporter des paroles-Les pronoms relatifs que, qui ou ou.

UNIT III-LECON 14-15

12

Leçons 14.Qui ne risque rien n'a rien-15.la fortune sourit aux audacieux-réponses aux questions tires de la leçon-grammaire : comparaison-les phrases au passe compose.

UNIT :IV-LECON 16-18

12

Leçons 16 la publicité et nos rêves 17 la France la monde 18 campagne publicitaire réponses aux questions tires de la leçon-grammaire :les phrases a l'imparfait-les phrases au future

UNIT :V- COMPOSITION :

12

A écrire une lettre de regret//refus a un ami concernant l'invitation d'une célébration reçue-a écrire un essaie sur un sujet générale-a lire le passage et répondre aux questions.

TEXTBOOK :

Jack GIRARDER & Jean Marie GRIDLIG,<<Méthode de Français PANORAMA>>, Clé Internationale, Goyal Publication ,New Delhi Edition 2014.

REFERENCE BOOKS:

DONDO Mathurin, "Modern French Course", Oxford University Press, New Delhi Edition 2014.

Nithya Vijayakumar get ready French grammar-Elementary Goyal publications ,New Delhi Edition 2014.

ENGLISH- I

5 0 0 5

COURSE OBJECTIVE:

- To enable students to develop their communication skills effectively. To make students familiar with the English Language.
- To enrich their vocabulary in English
- To develop communicative competency

12

UNIT I - Preparatory Lesson

1. Competition Matters
Suzanne Sievert
2. A Personal Crisis May Change History
Dr. A.P.J. Abdul Kalam
3. Why Preserve Biodiversity
Prof. D. Balasubramanian

UNIT II –Prose

12

1. The Unexpected
Robert Lynd
2. My Greatest Olympic
Prize Jesse Owens
3. If You are wrong, admit it
Dale Carnegie

UNIT III –Poetry

12

1. The Night of the Scorpion
Nissim Ezekiel
2. Pulley or The Gift of
God George Herbert
3. La Bella Dame Sans Merci
John Keats

UNIT IV- Short Story

12

1. The Gift of
Magi O Henry
2. Three Questions
Leo Tolstoy

UNIT V – One Act Play

12

1. The Shirt
Francis Dilion
2. The Pie and the Tart
Hugh Chester man

Total: 60 Hours

Books Prescribed:

Confluence - Anu Chithra Publications

COURSE OBJECTIVE:

- To enable students to develop their communication skills effectively
- To make students familiar with various sentence patterns of the English Language
- To enrich their vocabulary in English
- To develop communicative competency

	Credit Hours
UNIT-I Prose	12
1. The Words of Wisdom Chetan Bhagat	
2. Forgetting Robert Lynd	
3. My Early Days Dr. A.P.J. Abdul Kalam	
UNIT II –Poetry	12
1. Ozymandias Percy Bysshe Shelley	
2. Mending Wall Robert Frost	
3. Where the Mind is Without Fear Rabindranath Tagore	
UNIT III –Short Story	12
1. Am I Blue? Alice Walker	
2. The Last Leaf O’ Henry	
3. The Selfish Giant Oscar Wilde	
UNIT IV – One Act Play	12
1. Soul Gone Home Langston Hughes	
UNIT V	12
1. Lexical Skills	
2. Vocabulary	
3. Communication and Grammar at the end of all lessons	

Total: 60 Hours**Books Prescribed:**

Radiance - Emerald Publications

UNIT I INTRODUCTION 6

The multidisciplinary nature of Environment of studies – Definition - Scope and Importance - Need for Public Awareness.

UNIT II NATURAL RESOURCES 6

Natural resources and associated problem - Renewable and Non- Renewable resources:-Forest Resources-Mineral Resources-Food Resources - Energy Resources-Land Resources; Role of an individual in conservation of natural resources- Equitable use of resources of sustainable lifestyles.

UNIT III ECO SYSTEM 6

Concepts of an Ecosystem - Structure and Functions of an Ecosystem - Procedures, Consumers and Decomposers - Energy flow in the ecosystem - Food chains, Food webs and ecological pyramids - Introduction, types, Characteristics features - Structures and functions of the following ecosystem :Forest ecosystem, Grass land ecosystem, Desert ecosystem, Aquatic ecosystem.

UNIT IV BIODIVERSITY AND ITS CONSERVATION 6

Introduction - Definition, genetic, species and ecosystem diversity - Biogeographical classification of India - Value of Bio-diversity - Bio-diversity at global, National and Local levels - India s a mega-diversity nation - Hot-Spots of diversity - Threats to diversity: Habitats loss, poaching of Wild life, man wild life conflicts - Endangered and Endemic species of India In-Situ conversation of Bio-diversity.

UNIT V ENVIRONMENTAL POLLUTION AND HUMAN RIGHTS 6

Definition - Causes, effects and control measures of : Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution - Soil pollution management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Pollution – Case studies -Disaster Management – Flood, earthquakes, cyclone of landslidesEnvironment and human health - Human rights - Value education - HIV/AIDS - Women and child welfare - Role of information technology in Environment and Human health - Case study

TOTAL: 30 Hours

Text Book:

1. Text Book Of Environmental Engineering, R. Venugopala Rao, Eastern Economy Edition.

Reference Books:

1. Environmental studies, Dr. N. Arumugam, Prof.V. Kumaresan.
2. Environmental studies, Thangamani & Shyamala Thangamani.

List of Skill Enhancement Courses

UG SOFT SKILLS – II

1. Presentation Skills

Elements of an effective presentation – structure of presentation – voice modulation – Audience analysis – Body language

2. Soft Skills

Time Management – Articulateness – Assertiveness – Stress management

3. Resume / Report preparation / Letter Writing

Structuring the resume / Report – Business letters – E-Mail Communication

4. Interview Skills

Kinds of Interviews – Required by Skills – Corporate Culture – Mock Interviews

5. 30 Frequently asked questions

BOOKS RECOMMENDED

1. Barun K.Mitra. Personality Development and soft skills. Oxford University Press. New Delhi. 2011.
2. S P Sharma. Personality Development. Pustaq Mahal. New Delhi. 2010.
3. Meenakshi Raman and Sangeetha Sharma. Technical Communication. Oxford University Press. New Delhi. 2009.

ETHICS AND VALUES

2002

UNIT I INTRODUCTION	6
Why Value Education – Ethical Reflections – What is Ethics? Swami Vivekananda	
UNIT II APPROACH TO LIFE	6
Approach to Life - Happiness as Goal - Historical Perspective – Life in the Past and Present	
UNIT III KINDS OF VALUES	6
Kinds of Values S.Ignacimuthu S.J – Living Excellence Anthony Robbins – Concern for Others – Student’s Definition why Concern.	
UNIT IV GOALS AND HUMAN RIGHTS	6
Use Goals to help you grow David J.Schwartz – essential Characteristics of Human Rights.	
UNIT V INFLUENCE OF SCIENCE AND TECHNOLOGY IN HUMAN’S SOCIALLIFE	6
Social Relevance of Science and Technology – Economic Awareness – Economic Features – Status of Women – Mass Media and Values.	

TOTAL: 30 Hours

Text Book:

1. Touchstone: Synergy of Values – University of Madras.

Reference Book:

1. In harmony- Value Education at College Level- Dept. of Ethics and Religious Studies Loyolla College, Madras.