Teaching and Evaluation Scheme for TY B. Tech.

Department:Artificial Intelligence and Data Science

Semester:V & VI

Department: Artificial Intelligence and Data Science   **Rev:** Course Structure/00/2021-22

Class: T.Y. B.Tech   **Semester:**V

Sr. No.	Course Code	Course Type	Course	Teaching Scheme				Evaluation Scheme					Credits
				L	T	P	Total Hrs.	CA1	CA2	MSE	ESE	Total	
1	AD501	PCC	Software Engineering	3	-	-	3	10	10	30	50	100	3
2	AD502	PCC	Data Science and Visualization	3	-	-	3	10	10	30	50	100	3
3	AD503	PCC	Design Analysis & Algorithm	3	-	-	3	10	10	30	50	100	3
4	AD504	PCC	Advanced JAVA Programming	3	-	-	3	10	10	30	50	100	3
5	OEC01	OEC	Open Elective-I(Data Structure)	3	-	-	3	10	10	30	50	100	3
6	AD505	PEC	Elective-II	1	-	2	3	15	15	-	20	50	2
7	AD506	PCC	Data Science and Visualization Laboratory	-	-	2	2	15	15	-	20	50	1
8	AD507	PCC	Design Analysis & AlgorithmLaboratory	-	-	2	2	15	15	-	20	50	1
9	AD508	PCC	Advanced JAVA programming Laboratory	-	-	2	2	15	15	-	20	50	1
10	HMS05	HSMC	Aptitude Skills-III	1	-	-	1	25	25	-	-	50	1
11	HMS06	HSMC	Language Skills-III	-	-	2	2	25	25	-	-	50	Audit
12	PRJ04	PROJ	Mini Project – IV	-	-	2	2	25	25	-	-	50	1
			Total	17	-	12	29	185	185	150	330	850	22

Elective –II: AD505A-Android Application Development
   AD505B-UNIX shell programming
AD505C-Network Programming

Open Elective-I:OEC01- Data Structure

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD501	PCC	Software Engineering	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture:3hrs/week Tutorial: --	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: --

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

CO1	Apply generic models to structure the software development process.
CO2	Illustrate fundamental concepts of requirements engineering and requirements specification.
CO3	Explain different notion of complexity at both the module and system level
CO4	Make use of some widely known design methods.
CO5	Summarize the role and contents of testing activities in different life cycle phases.
CO6	Explain agile software development

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	1	1	-	1	1	2	2	2	2	1
CO2	2	2	2	2	2	-	-	1	1	1	2	2	2	2	1
CO3	2	2	2	2	2	-	-	-	-	1	2	2	2	2	1
CO4	2	2	2	2	2	-	-	-	-	1	2	2	2	2	1
CO5	2	2	2	2	2	-	-	-	-	1	2	2	2	2	1
CO6	2	2	2	2	2	-	-	-	-	1	2	2	2	2	1

Course Contents:	Hours
Unit 1: The Evolving role of Software – Software – The changing Nature of Software – Legacy software —A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment – Personal and Team Process Models. Product and Process. Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – the Unified Process.	7

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Unit 2: Software Engineering Practice – communication Practice – Planning practice Modeling practice– Construction Practice –Deployment. Requirements Engineering - Requirements Engineering tasks – Initiating the requirements Engineering Process Eliciting Requirements – Developing Use cases – Building the Analysis Models – Elements of the Analysis Model – Analysis pattern – Negotiating Requirements – Validating Requirements.	7
Unit 3: Requirements Analysis – Analysis Modeling approaches – data modeling concepts – Object oriented Analysis – Scenario based modeling – Flow oriented Modeling – Class based modeling – creating a behavior model.	6
Unit 4: Design Engineering – Design process -Design Quality-Design model-User interface Design – Testing strategies- strategies Issues for conventional and object oriented software-validation testing –system testing –Art of debugging – Project management	6
Unit 5: Software evolution - Verification and Validation -Critical Systems Validation – Metrics for Process, Project and Product-Quality Management -Process Improvement –Risk Management- Configuration Management	6
Unit 6: Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values	6

Text Book:
1. Roger S.Pressman, Software Engineering: A Practitioner's Approach, McGraw Hill International edition, Sixth edition, 2005.
2. Ian Sommerville, Software Engineering, 8th Edition, Pearson Education, 2008(UNIT V)
3. David J. Anderson and Eli Schragenheim, ―Agile Management for Software Engineering: Applying the Theory of Constraints for Business Resultsl, Prentice Hall, 2003

Reference Book:
1. Stephan Schach, Software Engineering, Tata McGraw Hill, 2007.
2. Pfleeger and Lawrence Software Engineering: Theory and Practice, Pearson Education, second edition, 2001
3. Craig Larman, ―Agile and Iterative Development: A Manager_s Guidel, Addison-Wesley, 2004.
4. Kevin C. Desouza, ―Agile Information Systems: Conceptualization, Construction, and Managementl, Butterworth-Heinemann, 2007.

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD502	PCC	Data Science and Visualization	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3hrs/week Tutorial: --	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: 'C' Language

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

CO1	Applypreprocessingtechniquesondata.
CO2	Explainbasicsofdatascience.
CO3	Applydifferentdatavisualizationtechniquestounderstandthedata.
CO4	Modelmultidimensionaldataandvisualizeitusingappropriatetool.
CO5	Analyzethedatausingsuitablemethod;visualizeusingtheopensourcetool.
CO6	Apply data science libraries on data.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	1	-	1	-	2	2	1	1	1	1	1
CO2	2	1	1	-	2	-	-	-	2	1	1	1	-	1	1
CO3	2	1	1	-	2	-	-	-	2	1	1	1	-	1	1
CO4	2	1	1	-	2	-	-	-	2	1	1	1	-	1	1
CO5	2	1	1	-	2	-	-	-	2	1	1	1	-	1	1
CO6	2	1	1	-	2	-	-	-	2	1	1	1	-	1	1

Course Contents:

Unit 1: Introductionto DataScience

DefiningDataScienceandBigData,RecognizingDifferentTypesofData,GainingInsightIntoDataScienceProcess RelationwithDataScience.

Unit 2: Data Pre-processing

Data Preprocessing: Data Quality, Major Tasks in Data Preprocessing, Entity Identification Problem, Redun Detection and Resolution, Data Reduction, Overview of Data Reduction Strategies.

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Unit 3: BasicsofDataVisualization

Introduction to Data Visualization, Challenges of Data Visualization, Definition and Types of Dashboard, E Dashboard.

Unit 4: Data Visualization using Python
TypesofDataVisualization:BasicChartsScatterPlots,Histogram,AdvancedVisualization TechniquesLikeStrea

Unit 5:Data visualization of multidimensional data
NeedofDataModeling,MultidimensionalDataModels,MappingofHighDimensionalData
Into SuitableVisualizationMethod-PrincipalComponentAnalysis,ClusteringStudyofHighDimensionalData,V

Unit 6:Data Analyzing and Visualization using python
Data Analysis Libraries: Will Learn to Use Pandas Dataframes, Numpy Multi-Dimentional Arrays, and
Library: Load, Manipulate,AnalyzeandVisualizeVariousDatasets.Matplotlib,Scikit-Learn.

Text Book:

Data Analysis Libraries: Will Learn to Use Pandas Dataframes, Numpy Multi-Dimentional Arrays, and
Scipy Libraries to Work with a Various Dataset, Pandas, An Open-Source Library: Load, Manipulate,
Analyze and Visualize Various Datasets. Matplotlib, Scikit-Learn.

Reference Book:

1.AliceZheng-
EvaluatingMachineLearningModels:ABeginner'sGuidetoKeyConceptsandPitfalls,O'ReillyMedia,2015,ISBN
1491932465,9781491932469.
2.Bigdata blackbook,DreamTechPublication.
3.BenFry-VisualizingData.ReleasedDecember2007.Publisher(s):O'ReillyMedia, Inc. ISBN:9780596514556
4.DataScience UsingPythonandR byChantalD.LaroseandDanielT.Larose,WileyPublication.
5.Python for Data Science and Visualization -Beginners to Pro, Udemy.

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD503	PCC	Design Analysis & Algorithm	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3hrs/week Tutorial: --	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Data Structure

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

CO1	Understand basics of algorithm and analyze performance of different algorithms using Divide and conquer.
CO2	Understand greedy Approach and Analyze the performance by taking different examples
CO3	Understand dynamic approach and Analyze the performance by taking different examples.
CO4	Design algorithm by applying backtracking technique.
CO5	Understand and Design NP Hard and NP Complete Problems
CO6	Understand concepts of branch and bound, compare performance with backtracking.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	1	-	-	-	-	2	2	3	3	1
CO2	2	2	2	2	2	-	1	-	-	-	2	2	3	3	1
CO3	2	2	2	2	2	-	-	-	-	-	2	2	3	3	1
CO4	2	2	2	2	2	-	-	1	-	-	2	2	3	3	1
CO5	2	2	2	2	2	-	-	-	1	-	2	2	3	3	1
CO6	2	2	2	2	2	-	-	-	-	1	2	2	3	3	1

Course Contents:	Hours
Unit 1: Divide and Conquer What is algorithm, Algorithm Specification, Performance Analysis, and Randomized Algorithms, Divide and Conquer-The general method, Binary search, finding the maximum and minimum, Merge sort, Quick sort, Selection sort and analysis of these algorithms.	6
Unit 2: Greedy Method The general method, Activity Selection Problem, Huffman Coding Knapsack problem, Job sequencing with deadlines, Minimum-cost spanning trees – Prim's	6

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and Kruskal's Algorithms Optimal storage on tapes Optimal merge patterns analysis, Single source shortest paths notations.	
Unit 3: Dynamic Programming Introduction, Characteristics of Dynamic Programming, Shortest paths: Bellman Ford, Floyd ,Warshall, Multistage graphs, All pair shortest paths, Optimal binary search trees, 0/1 knapsack, Reliability design, Traveling Sales person problem	6
Unit 4: Basic Traversal and Search Techniques and Backtracking Techniques for Binary Trees, Techniques for Graphs – Breadth First Search & Traversal Depth First Search & Traversal, AND/OR graphs; Backtracking Concept, N–Queens Problem, Four–Queens Problem, Eight–Queen Problem, Hamiltonian Cycle, Sum of Subsets Problem, Graph Coloring Problem.	6
Unit 5: Hard and NP Complete Problems Basic Concepts NP Complete Problems, Introduction to NP, Hard Graph Problems.	6
Unit 6: Branch and Bound Introduction, Traveling Salesperson Problem,15-Puzzle Problem, Comparisons between Backtracking and dynamic programming, Comparisons between Backtracking and greedy programming, Branch and Bound.	6

Text Book: 1. Fundamentals of Computer Algorithms - Ellis Horowitz, Satraj Sahani, Saguthevar Rajasejaran, Universities Press, Second Edition 2. Fundamentals of Algorithmic – Gilles Brassard, Paul Bratley (Pearson Education). 3. Computer Algorithms- Introduction to Design and Analysis – Sara Baase, Allen Van Gelder (Pearson Education).
Reference Book: 1. Computer Algorithms- Introduction to Design and Analysis – Sara Baase, Allen Van Gelder (Pearson Education). 2. Michel Goodrich, Roberto Tamassia, Algorithm Design – Foundation, Analysis & Internet Examples, Wiley Publication, 2nd Edition, 2006

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD504	PCC	Advanced Java Programming	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3hrs/week Tutorial: --	CA 1:10 Marks CA 2:10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Java Programming

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

CO1	DevelopprogramsusingGUIFramework(AWTandSwing)
CO2	HandleeventsofAWTandSwingscomponents.
CO3	Develop programs to handle events in Java Programming
CO4	DevelopJavaprogramsusingnetworkingconcepts.
CO5	Developprogramsusingdatabase
CO6	DevelopprogramsusingServlet

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	-	-	-	1	1	1	1	1	2	2
CO2	2	2	2	2	2	-	-	-	1	1	1	1	1	2	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2
CO4	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2
CO6	2	2	2	2	2	-	-	-	1	1	1	1	1	2	2

Course Contents:	Hours
Unit 1: Component, container, window, frame, panel. Creating windowed programs and applets. AWT controls and layout managers: use of AWT controls: labels, buttons, checkbox, check box group, scrollbars, text area, Use of layout managers: flow Layout, border Layout (), grid Layout, card Layout, grid bag Layout, menu bars, menus, dialog boxes, file dialog.	6
Unit 2: Introduction to swing: Swing features,DifferencebetweenAWT anSwing. SwingComponents:JApplet, IconsandLabels,TextFields,ComboBoxes. Buttons: The JButton, Check Boxes,RadioButtons. Advanced Swing Components: TabbedPanes, ScrollPanes, Trees, Tables, Progressbar, tooltips.MVCArchitecture.	6
Unit 3:	6

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ThedelegationEventsources,Eventlisteners Model: Eventclasses:TheActionEventclass, the ItemEvent class, theKeyEventclass,the MouseEventclass,theTextEventclass,theWindowEventclass.Adapterclasses. Innerclasses. Eventlistenerinterfaces: ActionListener Interface,ItemListenerInterface,KeyListenerInterface,MouseListenerInterface,MotiseMotionInterface,TextListenerInterface, WindowsListenerInterface	
Unit 4: Socket Overview: Client/Server, Reserved Sockets, Proxy Servers Internet addressing Java and the Net: The Networking Classes and interfaces. InetAddress: Factory Methods, Instance Methods. TCP/IP Client Sockets URL: Format, The URl Class. URLConnection : TCP/IP Server Sockets, Datagrams : Datagram Packet , Datagram server and Client	6
Unit 5: IntroductiontoJDDC,ODBC JDBC Architecture: Two tier & Three tier models TypesofJDBCDriversDriver Interfaces and Driver, Manager class: Connection Interface, Statement Interface, Prepared Statement Interface,Result SetInterface, The essential JDBC Program	6
Unit 6: TheLifeCycleofa Servlet CreatingsimpleServlet: The ServletAPI, javax. servlet Package, ServletInterface,Servlet ConfigInterface,Servlet Context Interface,Servlet Request Interface,Servlet Response Interface,Generic ServletClass The javax.servlet. http Package:HttpServletRequestInterface ,HttpServletResponseInterface,HttpSessionInterface,CookieClass,HttpServletClass,HttpSessionEventClass,HttpSession BindingEventClass. Handling HTTP Requests andResponses Handling HTTP GETRequests HandlingHTTPPOSTRequests. Cookiesand SessionTracking	6

Reference/Text Book:
 	
    1. Complete ReferenceJava 2 Programming
    2. Black book Java programming

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD505A	PEC	Android Application Development	1-0-2	2 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 1hr/week Tutorial: --	CA 1: 15 Marks CA 2 : 15 Marks Mid Semester Exam: -- End Semester Exam: 20 Marks

Pre-Requisites: JAVA programming

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

CO1	Organize Android environment and development tools.
CO2	Develop user Interfaces by using layouts and controls.
CO3	Make use of different UI components
CO4	Apply the given Intents and service in Application development.
CO5	Create Android application using database.
CO6	Develop application using telephony manager and map based activity

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	1	-	-	-	2	1	1	1	1	1	1
CO2	2	2	2	2	1	-	-	-	2	1	1	1	1	1	1
CO3	2	2	2	2	2	-	-	-	2	1	1	1	1	1	1
CO4	2	2	2	2	2	-	-	-	2	1	1	1	1	1	1
CO5	2	2	2	2	2	1	1	1	2	1	1	1	1	2	1
CO6	2	2	2	2	2	2	1	1	2	1	1	1	1	2	2

Course Contents:	Hours
Unit 1: Introduction to Android OS Android OS design and Features, Android Ecosystem, need of Android, , Architecture of android,JDK,SDK, Android Development Tools(ADT),Android Virtual Devices(AVDs), Dalvik Virtual Machine DVM, Downloading and Installing Android studio	2
Unit 2: Android User Interface and Layouts Android Directory Structure, Components of a screen,Fundamental UI Design, Layouts: Linear, Frame, Relative, Table Layout	3
Unit 3: Working UI components	3

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Text View, Edit Text Button,Image Button, Toggle Button, Radio Button And Radio Group, Checkbox,List View; Grid View, ImageView, Scroll View, Time And Date Picker.	
Unit 4: Intents and Broadcasts Intent, Intent_Filter, Activity Lifecycle; Broadcast Lifecycle, Content provider, Fragments, Android services, Lifecycle of Android Service, Methods of android services.	2
Unit 5: Multimedia and Database Multimedia framework, Play Audio and Video, Sensors, Async tasks, Audio Capture, Camera, Bluetooth, AnimationSQLite Database, Creation and connection of the database.	2
Unit 6: SMS Telephony and location based services Android SMS, Working with Google Maps, Location Based Services – Finding Current Location and showing location on the Map.	2

Practical List:

1	Install and configure android studio and JDK, android SDK and ADT plug-in
2	Develop program using linear layout and frame layout
3	Develop a program to implement table layout and relative layout.
4	Develop a program to implement Text View, Edit Text and Button.
5	Develop a program to implement Image Button and Toggle Button.
6	Develop a program to implement checkbox, Radio Button and Radio Group.
7	Develop a program to implement List View, Grid View, Image View and Scroll View.
8	Develop a program to implement Date and Time Picker.
9	Develop a program to create activity using explicit intent and implicit intent.
10	Program to play audio, video file
11	Develop a program to build Camera.
12	Develop a program for providing Bluetooth connectivity.
13	Develop program to insert data in database.
14	Develop a program to send and receive SMS
15	Develop a program to locate the user's current location.

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Text Book:

1. Android Programming for Beginners- Hortan ,John Packet Publication, 2015,ISBN: 978-1-78588-326-2
2. Android™ Programming Unleashed- B.M. Harwani Copyright © 2013 by Pearson Education, Inc.

Reference Book:
1Android - Dixit, Prasanna Kumar Vikas Publications, New Delhi 2014, ISBN: 9789325977884
2. Lee, Beginning AndroidTM 4 Application Development, Wrox Publication, 2011.

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD505B	PEC	UNIX Shell Programming	1-0-1	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 1hrs/week Tutorial: --	CA 1: 15 Marks CA 2 : 15 Marks Mid Semester Exam: -- End Semester Exam: 20 Marks

Pre-Requisites: Operating system

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

CO1	Demonstration of various commands using UNIX file system
CO2	Outline different types of UNIX and PONIX file system
CO3	Make use of UNIX process concepts to solve the real time problems
CO4	Illustrate Signals and Daemon Processes
CO5	Make use of interprosses communication to solve real time problems.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1	1	-	1	-	1	1	1	1	2	1	1
CO2	2	2	2	1	1	-	1	-	1	1	1	1	2	1	1
CO3	2	2	2	1	1	-	1	-	1	1	1	1	2	1	1
CO4	2	2	2	1	1	1	1	-	1	2	1	2	2	1	2
CO5	2	2	2	2	1	1	1	1	1	2	2	2	2	1	2

Course Contents:	Hours
Unit 1:Introduction to UNIX and its Commands: UNIX and ANSI Standards: The ANSI C Standard, The ANSI/ISO C++ Standards, Difference between ANSI C and C++, The POSIX Standards, The POSIX.1 FIPS Standard. UNIX and POSIX APIs: The POSIX APIs, The UNIX and POSIX Development Environment, API Common Characteristics, The File System: The File, What's in a (File)name, The Parent-Child relationship, The UNIX File System, pwd, Absolute pathnames, cd, Relative pathnames, mkdir, rmdir, cp, rm, mv, cat, ls.	3
Unit 2:UNIX Files File Types, The UNIX and POSIX File System, The UNIX and POSIX File Attributes, Inodes in UNIX System V, Application Program Interface to Files, UNIX Kernel Support for Files, General File APIs, Directory File APIs , Device File APIs, FIFO File APIs , Symbolic Link File APIs, File and Record Locking.	2

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Unit 3: UNIX Processes File Types, The UNIX and POSIX File System, The UNIX and POSIX File Attributes, Inodes in UNIX System V, Application Program Interface to Files, UNIX Kernel Support for Files, General File APIs, Directory File APIs , Device File APIs, FIFO File APIs , Symbolic Link File APIs, File and Record Locking.	3
Unit 4: Signals and Daemon Processes: Signals: The UNIX Kernel Support for Signals, signal, Signal Mask, sigaction, The SIGCHLD Signal and waitpid API, The sigsetjmp and siglongjmp Functions, kill, alarm, Interval Timers.	3
Unit 5: Inter-process Communication: Introduction, Pipes, popen and pclose Functions, Co-processes, FIFOs, Message Queues, Semaphores, Shared Memory	2

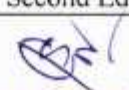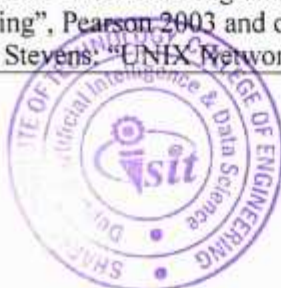|	**List of experiments**
1.	Write a C/C++ POSIX compliant program to check the following limits: (i) No. of clock ticks (ii) Max. no. of child processes (iii) Max. path length (iv) Max. no. of characters in a file name (v) Max. no. of open files/ process
2.	Write a C/C++ POSIX compliant program that prints the POSIX defined configuration options supported on any given system using feature test macros.
3.	Consider the last 100 bytes as a region. Write a C/C++ program to check whether the region is locked or not. If the region is locked, print pid of the process which has locked. If the region is not locked, lock the region with an exclusive lock, read the last 50 bytes and unlock the region.
4.	Write a C/C++ program which demonstrates interposes communication between a reader process and a writer process. Use mkfifo, open, read, write and close APIs in your program.
5.	a) Write a C/C++ program that outputs the contents of its Environment list b) Write a C / C++ program to emulate the unix ln command
6.	Write a C/C++ program to illustrate the race condition.
7.	Write a C/C++ program that creates a zombie and then calls system to execute the ps command to Verify that the process is zombie.
8.	Write a C/C++ program to avoid zombie process by forking twice.
9.	Write a C/C++ program to implement 'system' function.
10	Write a C/C++ program to set up a real-time clock interval timer using the alarm API.

Text Book:
1. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff: "UNIX Network Programming". Volume 1, Third Edition, Pearson 2004 and onwards.

Reference Book:
1.Barry Nance: "Network Programming in C", PHI 2002 3.Bob Quinn, Dave Shute: "Windows Socket Network Programming", Pearson 2003 and onwards.
2. Richard Stevens: "UNIX Network Programming". Volume 2, Second Edition 2006 and onwards.

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD505C	PEC	Network Programming	1-0-1	2 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 1hrs/week Tutorial: ---	CA 1: 15 Marks CA 2 : 15 Marks Mid Semester Exam: -- End Semester Exam: 20 Marks

Pre-Requisites: Data communication

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

CO1	Understand Client-server communication model
CO2	Demonstrate socket concept
CO3	Demonstrate Elementary UDP socket
CO4	Make use ofIpv4 and IPv6 Interoperability
CO5	Make use of broadcasting and multicasting concept to solve real time problems.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1	1	-	1	-	1	1	1	1	2	1	1
CO2	2	2	2	1	1	-	1	-	1	1	1	1	2	1	1
CO3	2	2	2	1	1	-	1	-	1	1	1	1	2	1	1
CO4	2	2	2	1	1	1	1	-	1	2	1	2	2	1	2
CO5	2	2	2	2	1	1	1	1	1	2	2	2	2	1	2
CO6	2	2	2	1	1	-	1	-	1	1	1	1	2	1	1

Course Contents:	Hours
Unit 1:Introduction: Introduction, Client/server communication, OSI Model, BSD Networking history, Test Networks and Hosts, Unix Standards, 64-bit architectures. Transport Layer: TCP, UDP and SCTP, TCP Connection Establishment and Termination.	3
Unit 2: Sockets Introduction Introduction, Socket Address Structures, Value-Result Arguments, Byte Ordering and Manipulation Functions. Elementary TCP Sockets: socket, connect, bind, listen, accept, fork and exec, ConcurrentServer design, getcsockname and getpeername functions.	3
Unit 3: Elementary UDP Sockets recvform and sendto Functions, UDP Echo Client/Server- main, dg_echo and dg_cli Functions, Lost Datagrams, Verifying received Responses, Server Not Running, connect	3

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Function with UDP, Lack of Flow control with UDP, Determining Outgoing Interface with UDP, TCP and UDP Echo Server using select. **Elementary SCTP Sockets**: Interface Models, shutdown function, Notifications.	
Unit 4: Advanced Sockets 1 **Ipv4 and IPv6 Interoperability:** IPv4 Client and IPv6 Server, IPV6 Client ad IPv4 Server, IPv6 Address-Testing Macros, Source Code Portability **Daemon Processes:** syslogd Daemon , syslog Function.	2
Unit 5: Advanced Sockets 2 **Broadcasting:** Introduction, Broadcast Addresses, Unicast vs Broadcast, dg_cli Function using Broadcasting, Race Conditions. **Multicasting:** Introduction, Multicast Addresses, Multicast vs Broadcast on a LAN, Multicast on a WAN, Source-Specific Multicast.	3

Text Book: 1. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff: "UNIX Network Programming". Volume 1, Third Edition, Pearson 2004 and onwards.
Reference Book: 1.Barry Nance: "Network Programming in C", PHI 2002 3.Bob Quinn, Dave Shute: "Windows Socket Network Programming", Pearson 2003 and onwards. 2. Richard Stevens: "UNIX Network Programming". Volume 2, Second Edition 2006 and onwards.

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD506	PCC	Data Science and Visualization Laboratory	0-0-1	1 Credits

Teaching Scheme:	Examination Scheme:
Practical: 2hr/week	CA1: 15 Marks CA2: 15Marks Practical and Oral Exam:--20 Marks

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

CO1	Understand and describe the main concepts of data visualization.
CO2	Analyze data using exploratory visualization.
CO3	Create useful, performant visualizations from real-world data sources, including large and complex datasets.
CO4	Model data visualization and dashboards.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	2	-	1	-	2	2	1	2	1	1	1
CO2	2	1	1	-	2	-	-	-	2	1	1	1	-	1	1
CO3	2	1	1	-	2	-	-	-	2	1	1	1	-	1	1
CO4	2	1	1	-	2	-	-	-	2	2	1	2	-	2	1

Practical List:

1	To study data science basics.
2	To download and observe different datasets from Kaggle.com
3	To understand different operations on data.
4	Access an open source dataset "Titanic". Apply pre-processing techniques on the raw dataset.
5	Build training and testing dataset of assignment 1 to predict the probability of a survival of a person based on gender, age and passenger-class.
6	Use Netflix Movies and TV Shows dataset from Kaggle and perform following operation: a. Make a visualization showing the total number of movies watched by children

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	b. Make a visualization showing the total number of standup comedies
	c. Make a visualization showing most watched shows
	d. Make a visualization showing highest rated show make a dashboard (DASHBOARD A) containing all of these above visualizations.
7	ExploreNewYorkCity-311ComplaintsandHousingdatasets.
8	AnalyzeandvisualizedatausingPython.
9	Perform feature engineering exercise using Python.
10	Build and validate predictive machine learning model using Python.

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD507	PCC	Design and Analysis of Algorithm Laboratory	0-0-2	1 Credits

Practical Scheme:	Examination Scheme:
Practical: 2 hrs/batch	CA 1: 15 Marks CA 2 : 15 Marks Mid Semester Exam: -- End Semester Exam: 20 Marks

Pre-Requisites: Basics related to C programming.

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

CO1	Design and implement algorithm by taking simple problems.
CO2	Implement algorithm on greedy Approach and Analyze the performance.
CO3	Develop an algorithm on dynamic approach and Analyze the performance.
CO4	Implement algorithm by applying backtracking technique.
CO5	Design and Implement algorithm on NP Hard and NP Complete Problems
CO6	Implement algorithm on branch and bound technique.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	-	-	-	-	-	-	-	-	1	-	-
CO2	2	2	-	-	2	-	-	-	-	-	-	1	2	-	-
CO3	3	2	1	-	2	-	-	-	-	-	-	1	1	-	-
CO4	3	2	-	-	2	-	-	-	-	-	-	1	1	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	2	2	-	-
CO6	3	2	-	-	2	-	-	-	-	-	-	2	2	-	-

Practical List

1.Implement Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements.
2. Implement Quick Sort algorithm and determine the time required to sort the elements
3. Implement Insertion Sort algorithm and determine the time required to sort the elements
4. Implement Heap Sort algorithm and determine the time required to sort the elements
5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using

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Dijkstra's algorithm
6. Find the Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
7. Find the Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
8. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.
9. Implement 0/1 Knapsack problem using Dynamic Programming.
10 Implement N Queen's problem using Back Tracking.

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

AD508	PCC	Advanced Java Programming Laboratory	0-0-2	1 Credits

Practical Scheme:	**Examination Scheme:**
Practical: 2 hrs/week	CA 1: 15 Marks CA 2 : 15 Marks Mid Semester Exam: -- End Semester Exam: 20 Marks

Pre-Requisites: Basics related to C programming.

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

CO1	Develop programs using GUI Framework (AWT and Swing)
CO2	Handle events of AWT and Swings components
CO3	Develop programs to handle events in Java Programming
CO4	Develop Java programs using networking concepts.
CO5	Develop programs using database
CO6	Develop programs using Servlet

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	2				1	1	1	1	1	2	2
CO2	2	2	2	2	2				1	1	1	1	1	2	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2
CO4	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2
CO6	2	2	2	2	2				1	1	1	1	1	2	2

Practical List

1. Write a program to demonstrate use of AWT controls.
2. Write a program to demonstrate different layouts.
3. Write a program to make use of swing controls
4. Write a program to handle different events.
5. Write a program to demonstrate use of Adapter class.
6. Write a program to retrieve hostname and IP address in InetAddress class.

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7. Write a program that demonstrates TCP/IP based communication between client and server.
8. Write a program to establish successful connection to database.
9. Write a servlet to display the user name and password accepted from the client.
10. Write a servlet for demonstrating the concept of session and cookies.

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

HMS05	HSMC	Aptitude Skill III	1-0-0	Audit

Teaching Scheme:	Examination Scheme:
Lecture: 1hrs/week Tutorial: NA Practical: NA	CA 1: 15 Marks CA 2 : 15 Marks Mid Semester Exam: -- End Semester Exam: --

Pre-Requisites: Communication Skills, Aptitude Skills I,II

Group A

Aptitude (12Hrs) (Compulsory)

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

1	Solve the problems on system of equation
2	Solve the problems on seating arrangement
3	Solve the logical reasoning problems
4	Solve the critical analysis problems
5	Solve the problems of Data interpretation
6	Solve the problems of permutations and Combinations

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2	2													
CO3	2													
CO4	2													
CO5	2													
CO6	2													

Course Contents:	Hours
Unit 1: System of equations quadratic equations, Surds and indices, solution of equations, Ages,	[2]
Unit 2: Seating Arrangements Linear seating Arrangement, Circular seating arrangement, Complex seating arrangement,	[2]

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Unit 3: Logical Reasoning Numerical based on sense of direction, Blood relations,Odd man Out	[2]
Unit 4: Critical analysis Clocks and Calendar based problems, Crypt arithmetic, heights and distances	[2]
Unit 5: Data Interpretation Table form, Bar form, Line for Pi chart form	[2]
Unit 6:Permutations and Combinations Numbers and Words Repetition allowed and Repetition not allowed	[2]

Text Books:
1. RS Aggarwal "A Modern Approach to Verbal & Non-Verbal Reasoning ",S. Chand Publisher; 2016 edition
2. RS Aggarwal, " Quantitative Aptitude for Competitive Examinations ", S. Chand Publisher; 2016 edition
3. Raymond Murphy "Essential English Grammar with Answers", Murphy
Reference Books:
1. Rao N,D,V,Prasada, Wren & Martin High School English Grammar and Composition Book, S Chand Publishing, 2017
2. Murphy, Intermediate English Grammar with Answers, Cambridge University Press;Second edition
3. RS Aggarwal, Objective General English, S. Chand Publisher; 2016 edition

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T.Y. (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE) Semester V

PRJ04	PROJ	Mini Project-IV	0-0-2	1 Credits

Teaching Scheme:	Examination Scheme:
Lecture: --	CA 1: 25 Marks
Tutorial: NA	CA 2 : 25 Marks
Practical: 2 hr/week	Mid Semester Exam: --
	End Semester Exam: 20 Marks

Prerequisites: Basic knowledge of Communication skills and Computer programming, artificial intelligence and data science.

Course Outcomes:	
Upon successful completion of this course, the students will be able to:	
1	Select the appropriate method for solving the problem
2	Make use of various engineering techniques and tools to give a solution
3	Justify the method/tools used to develop the solution.
4	Demonstrate tangible solutions to the problem
5	Describe the solution with the help of a project report and presentation.

About Mini Project

The project is a part of addressing societal and industrial needs. Mini project is one of the platforms that students will use to solve real-world challenges. This course focuses on the selection of methods/engineering tools/analytical techniques for problem-solving. Through this course, students gain a thorough understanding of engineering basics and ideas, gain practical experience, have the opportunity to display their skills and learn about teamwork, financial management, communication skills, and responsibility.

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Guidelines

1. Every student shall undertake the Mini project activity for semester V.
2. Minimum three and maximum of five students should work together in Mini project.
3. The students have to work on different approaches and finalize the best methodology to solve the problem in consultation with the project guide.
4. The students should use different tools /Techniques for the development of the solution to the problem.
5. While developing solutions, the student can take care of effective use of resources, follow ethical practices, finance management,
6. The solution should be optimal, affordable, user-friendly and environment friendly.
7. Critically analysis and testing of the solution provided.
8. By using IPR, students should reserve their rights of innovations as well as communicate new findings to society with the help of research papers.

The committee of senior faculty members and a project guide will be appointed to monitor the progress and continuous evaluation of each project. The assessment shall be done jointly by the guide and committee members.

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Teaching and Evaluation Scheme for TY B. Tech.

Department:Artificial Intelligence and Data Science

Semester: VI

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Department: AI&DS Engineering   **Rev:** Course Structure/00/2021-22

Class: T.Y. B.Tech.   **Semester:** VI

Sr No	Course Code	Course Type	Course	Teaching Scheme				Evaluation Scheme					Credit
				L	T	P	Total Hrs.	CA1	CA2	MSE	ESE	Total	
1	AD601	PCC	Data Warehousing and Data Mining	3	-	-	3	10	10	30	50	100	3
2	AD602	PCC	Machine learning	3	-	-	3	10	10	30	50	100	3
3	AD603	PCC	Artificial Intelligence	3	-	-	3	10	10	30	50	100	3
4	AD604	PEC	Elective-III	2	-	-	2	10	10	30	50	100	2
5	OEC02	OEC	Open Elective-II	3	-	-	3	10	10	30	50	100	3
6	AD605	PCC	Full Stack Development	1		2	3	15	15	-	20	50	2
6	AD606	PCC	Machine learning Lab	-	-	2	2	15	15	-	20	50	1
7	AD607	PEC	Elective-III lab	-	-	2	2	15	15	-	20	50	1
8	PRJ05	PROJ	Mega Project Phase –I (Seminar)	-	-	4	4	25	25	-	50	100	2
9	HMS07	HSMC	Aptitude Skills-IV	1	-	-	1	25	25	-	-	50	Audit
10	HMS08	HSMC	Language Skills-IV	-	-	2	2	25	25	-	-	50	1
11	IFT02	PROJ	Industrial Training/ Field Training	-	-	-	-	-	-	-	50	50	Audit
		Total		16	-	12	28	170	170	150	410	900	21

Elective-III   AD604A- Web Technology

AD604B- React JS and Node JS

AD604C- Angular JS

Open Elective-II: Principles of Cyber Security

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T.Y. (AI &DS Engineering) Semester VI

AD601	PCC	Data Warehousing and Data Mining	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3hrs/week Tutorial: ---	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-requisites: Data Base Management Systems, Design and Analysis of Algorithms

CO1	Outline fundamentals of data warehousing.
CO2	Understanding Data Warehouse and OLAP Technology
CO3	Experiment with Cluster analysis
CO4	Analyze predication and classification with various examples
CO5	Understanding Data Warehouse and OLAP Technology

Mappingofcourseoutcomeswithprogramoutcomes

Cour seOu tcom es	ProgramOutcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2
CO 2	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO 3	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO 4	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO 5	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2

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T.Y. (AI &DS Engineering) Semester VI

Course Contents:	Hours
Unit I **Data Mining:** Introduction, What is Data Mining?, Data Mining – on what kind of Data? Data Mining Functionalities-What kinds of patterns can be mined?, Classification of Data mining systems, Major issues in Data Mining.	6Hours
Unit II: **Data Warehouse and OLAP Technology:** What is Data Warehouse? A multidimensional Data model, Data Warehouse architecture. From data warehouse to Data mining.	6 Hours
Unit – III **Cluster Analysis:** What is cluster Analysis? Types of data in cluster analysis, Categorization of major clustering methods. Partitioning methods.	6 Hours
Unit – IV **Classification and Prediction**: What is Classification and Prediction? Issues regarding classification and prediction. Classification by Decision Tree Induction. Bayesian Classification. Back propagation	6 Hours
Unit – V **Data Warehouse and OLAP Technology:** What is Data Warehouse? A multidimensional Data model, Data Warehouse architecture. From data warehouse to Data mining.	6 Hours

Text Book: Jiawei Han, MichelineKamber ,Jian Pei: Data Mining - Concepts and Techniques , 3rd Edition, Morgan Kaufmann Publishers, 2011.

Reference Books
Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Addison-Wesley, 2007. G. K. Gupta: Introduction to Data Mining with Case Studies, 3rd Edition, PHI, New Delhi, 2014

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- **T.Y. (AI &DS Engineering) Semester VI**

AD602	PCC	Machine Learning	3-0-0	3Credits

TeachingScheme	ExaminationScheme
Lecture:3hrs/week Tutorial: ---	CA I:10 MarksCAII:10Marks Mid Semester Exam: 30MarksEndSemesterExam:50Marks

Pre-Requisites:Statistics, data science.

CourseOutcomes:At theend ofthecourse,students willbeable to:

CO1	Make use of basics of machine learning to perform classification algorithms
CO2	Choose & differentiate different supervised learning algorithms for solving the problems
CO3	Solve the problems by making use of concepts of neural networks
CO4	Identify suitable hypothesis by choosing correct theory among different theories
CO5	Choose and apply clustering algorithm and identify its applicability in real life problems

Mappingofcourseoutcomeswithprogramoutcomes

CO	ProgramOutcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2
CO2	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO3	1	3	2	2	2	1	-	1	1	1	2	2	2	2	2
CO4	1	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO5	2	1	2	2	2	1	1	1	1	1	2	2	2	2	2

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	[6]
Unit 1: Introduction:Basicdefinitions,typesoflearning,hypothesisspaceandinductive bias,evaluation,cross-validation,Linearregression, Decision trees,over fitting.	
Unit2: Instancebasedlearning,Featurereduction,Collaborativefilteringbasedrecommendation,Probability and Bayes learning.	[6]
Unit3: LogisticRegression,SupportVectorMachine,KernelfunctionandKernelSVM.	[6]
Unit4: Neural network: Perceptron, multilayer network, back propagation, introduction to deep neuralnetwork.	[6]
Unit5: Computationallearningtheory,PAClearningmodel,Samplecomplexity,VCDimension,Ensemblelearning.	[6]
Unit6: Clustering:k-means,adaptivehierarchicalclustering,Gaussianmixturemodel.	[6]

Reference/Textbooks:-

MachineLearning,TomMitchell,FirstEdition,McGrawHill,1997.

IntroductiontoMachine Learning,2ndEdition,byEthemAlpaydin

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. T.Y. (AI &DS Engineering) Semester VI

AD603	PCC	Artificial Intelligence	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3hrs/week Tutorial: ---	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-requisites: Data Base Management Systems, Design and Analysis of Algorithms

CO1	Illustrate Basics of AI using Components of AI
CO2	Demonstrate different searching strategies
CO3	Compare Results of various Constraint Satisfaction Problems
CO4	Model Adversarial Search Games, Optimal Decisions in Games
CO5	Understanding Logical Agents with various examples
CO6	Demonstrate Quantifying Uncertainties by Bayes' Rule

Course Outcomes	ProgramOutcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2
CO2	1	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO3	1	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO4	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO5	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2

Course Contents:	Hours
Introduction, What Is AI?, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, The State of the Art. Intelligent Agents Agents and Environments Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.	6Hours
Unit-II **Problem-solving** Solving Problems by Searching, Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions.	6 Hours
Unit – III Constraint Satisfaction Problems Defining Constraint Satisfaction Problems, Constraint Propagation: Inference in CSPs,Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problms.	6Hours
Unit 4: Game Playing Adversarial Search Games, Optimal Decisions in Games, Alpha–Beta Pruning.	6 Hours
Unit 5: Logical Agents Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic: A Very Simple Logic, Propositional Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic	6 Hours
Unit 6: Uncertainty Quantifying Uncertainty, Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use, Probabilistic Reasoning, Representing Knowledge in an Uncertain Domain,	6Hours

Text Book: Peter Norvig, Artificial Intelligence: A Modern Approach, Third Edition
Reference Books Peter Norvig, Artificial Intelligence: A Modern Approach, Third Edition

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T.Y. (AI &DS Engineering) Semester VI

AD604	PEC	AD604A- Web Technology	2-0-0	2 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 2hrs/week Tutorial: ---	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-requisites: Data Base Management Systems, Design and Analysis of Algorithms

CO1	Analyze a web page and identify its elements and attributes.
CO2	Create web pages using XHTML and Cascading Styles sheets.
CO3	Installation and usage of Server software's.
CO4	Database Connectivity to web applications
CO5	Build web applications using Servlet and JSP

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2
CO2	1	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO3	2	2	1	2	2	1	-	1	1	1	2	2	2	2	2
CO4	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO5	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2

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Course Contents:	Hours
Introduction,Web Basics and Overview: HTML Common tags: List, Tables, images, forms, frames, Basics of CSS and types of CSS. Client-Side Programming (Java Script): Introduction to Java Script, declaring variables, functions, Event handlers	**6Hours**
Unit-II **Problem-solving** Server-Side Programming (PHP): Declaring Variables, Data types, Operators, Control structures, Functions, Reading data from web form controls like text buttons, radio buttons, list, etc., Handling File Uploads, Handling Sessions & Cookies.	**6 Hours**
Unit 3 – Web Servers Web Servers: Introduction to web servers, installation and configuration. Introduction to Servlets: Lifecycle of a Servlet, JSDK, Deploying Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters	8 Hours
Unit 4: Introduction to JSP Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design and JSP Environment, JSP Declarations, Directives, Expressions, Code	**6 Hours**
Unit 5: Database Access Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.* package, Connecting to database in PHP, Execute Simple Queries, Accessing a Database from a Servlet and JSP page.	**6 Hours**

Text Book:

1 Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson (UNITs 3,4,5)

Reference Books
1. Jakarta Struts Cookbook, Bill Siggelkow, S P D O'Reilly for chap 8.
2. Programming world wide web-Sebesta,Pearson Education ,2007.

3.An Introduction to Web Design and Programming –Wang-Thomson

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T.Y. (AI &DS Engineering) Semester VI

AD60 4B	PEC	React JS	2-0-0	2 Credits

Teaching Scheme:	**Examination Scheme:**
Lecture: 2hrs/week Tutorial: ---	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: 'C' Language

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

CO1	Introducing Angular for developing modern, complex, responsive and scalable web applications
CO2	Understanding full architecture behind an React application
CO3	Understanding single-page applications with modern JavaScript frameworks
CO4	Demonstrate concepts of advanced java script.
CO5	Understanding component and lifecycle of react js
CO6	Design React event handling

Course Outcomes	ProgramOutcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2
CO2	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO3	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO4	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO5	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2

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Course Contents:	Hours
Unit 1: Introduction to React :Basics of React, Need of React, React version historyReact 16 vs React 15, Basics of JSX, difference between javascriptvs JSX virtual DOM One way binding, Setting up Development Environment, Basics of ES, Babel and npm	6hr
Unit 2: Components: Significance of component architecture,Types of components - 1. Functional.Class based,Pure vs impure functions Component Composition, Lifecycle of component, Presentational vs container component, Lists, Keys, Refs, Rendering Elements, Rendering Elements	6hr
Unit 3: state and props state and it significance, Read state and set state, Passing data to component using props, Validating props using prop Types, Supplying default values to props using default Props, Methods as Props, Unidirectional Data Flow	6hr
Unit 4: Event handling: Understanding React event system Understanding Synthetic event passing arguments to event handlers	6hr
Unit 5: NodeJs architecture ,Modules: Built-in and custom, Event loop, Asynchronous application , Testing node application	6hr

Text Book:

Artificial Intelligence: A Modern Approach, 4th US ed.by Stuart Russell and Peter Norvig

Reference Book: https://www.tutorialspoint.com/reactjs/reactjs_tutorial.pdf

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T.Y. (AI &DS Engineering) Semester VI

AD6 04C	PEC	Angular JS and Node JS	2-0-0	2 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 2hrs/week Tutorial: ---	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

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

CO1	Introducing Angular for developing modern, complex, responsive and scalable web applications ion
CO2	Understanding full architecture behind an Angular applicat
CO3	Understanding single-page applications with modern JavaScript frameworks
CO4	Understanding concepts of advanced web development.
CO5	Devise an architecture for solving the given problem.
CO6	Develop a web application using Angular and other back end technologies.

Course Outcomes	ProgramOutcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2
CO2	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO3	1	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO4	2	2	2	1	2	1	-	1	1	1	2	2	2	2	2
CO5	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2

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Course Contents:	Hours
Unit 1:Angular JS Basics: What is Angular JS? ,Why Angular JS? ,Why MVC matters ,MVC-The Angular JS way Features of Angular JS ,Model-View-Controller Angular Expressions, How to use expressions, Angular vs JavaScript, Built-In Filters, Using Angular JS Filters Creating Custom Filters	6
Unit 2:Directives and Controllers: Introduction to Directives, Directive LifecycleBinding controls to data, Matching directivesUsing Angular JS built-in directivesCreating a custom directive Role of a Controller, Controllers & Modules Attaching Properties and functions to scope Nested Controllers, Using Filters in Controllers, Controllers in External Files	6
Unit 3: Angular JS Modules, Scope: Introduction to Angular JS ModulesBootstrapping Angular JSWhat is scope, Scope LifecycleScope Inheritance, Scope & ControllersRoot scope, Scope BroadcastingTwo-way data binding, Scope InheritanceScope & Directives, $apply and $watchScope Events	6
Unit 4:Introduction to Node JS Introduction to Node JS Advantages of Node JS What is Node JS, Node.js Process Model Traditional Web Server Model,**Setup Development Environment,Node JS Modules**	6
Unit 5:Node Package Manager and Creating Web Server: What is NPM, Installing Packages Locally Installing package globally adding dependency in package json Updating packages,Creating Web Server Sending Requests, Handling http requests.	6
Unit 6:File System : Read File, Writing a FileOpening a file, Deleting a fileWriting a file asynchronouslyOther IO Operations.	6

Text Book:
Learn AngularJS in 1 Day: Complete Angular JS Guide with Examples Krishna Rungta   Learn AngularJS in 1 Day: Complete Angular JS Guide with Examples
Reference Book: Express - Node.js web application framework (expressjs.com)

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T.Y. (AI &DS Engineering) Semester VI

OEC02	OEC	Principles of Cyber Security	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3hrs/week Tutorial: ---	CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

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

CO1	Illustrate the concept of cybercrime and cyber offenses.
CO2	Emphasize on security challenges of mobile devices and organizational measures to handle such threats.
CO3	Explore the tools and methods used in cybercrime.
CO4	Elaborate on the legal perspectives of cybercrimes in India.
CO5	Illustrate the concept of Computer forensics
CO6	Illustrate the concept of Computer forensics

Mappingofcourseoutcomeswithprogramoutcomes

Course Outcomes	ProgramOutcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2

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CO2	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO3	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO4	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO5	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2

Course Contents:	Hours
Unit 1:Introduction to Cybercrime, Cyber offenses Definition and Origins of the Word Cybercrime, Cybercrime and Information Security, Who are Cybercriminals?, Classifications of Cybercrimes; Cybercrime - The Legal Perspectives, Cybercrimes - An Indian Perspective, Cybercrime and the Indian ITA 2000; A Global Perspective on Cybercrimes. How Criminals Plan the Attacks; Social Engineering; Cyber stalking; Botnets - The Fuel for Cybercrime, Attack Vector, Cloud Computing	[6]
Unit2:Cybercrime in case of Mobile and Wireless devices, Phishing and Identity Theft Proliferation of Mobile and Wireless Devices; Trends in Mobility, Security challenges posed by mobile devices, Registry settings for mobile devices, Authentication Service Security	[6]
Unit3:Tools and Methods Used in Cybercrime Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks.	[6]
Unit4:The Legal Perspectives Cybercrime and the Legal Landscape around the World, Why Do We Need Cyberlaws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime.	[6]
Unit5:Computer Forensics Digital Forensics Science, The Need for Computer Forensics, Cyberforensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation,	[6]
Unit6: Computer Forensics Setting up a Computer Forensics Laboratory: Understanding the Requirements, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats,	[6]

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Text Book: Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives – Nina Godbole, SunitBelapure, Wiley : April 2011 India Publications Released

2. Computer Forensics and Cyber Crime An Introduction by Marjie T. Britz ,Pearson publication, 2nd edition

Reference Book

Computer Forensics and Cyber Crime An Introduction by Marjie T. Britz ,Pearson publication, 2nd edition

T.Y. (AI &DS Engineering) Semester VI

AD605	PCC	Full Stack Development		3-0-0	3 Credits
Teaching Scheme:			**Examination Scheme:**		
Lecture: 3hrs/week Tutorial: ---			CA 1: 10 Marks CA 2 : 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks		

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

CO1	Demonstrate the basics of advanced HTML tags
CO2	Explain CSS advanced concepts of grouping and nesting concepts
CO3	Rephrase concepts of JavaScript –creating empty hyperlinks
CO4	Develop the concepts of Escaping content programming Fundamentals
CO5	Make use of Advanced JavaScript Concepts

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2
CO2	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2

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CO3	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO4	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO5	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2

Course Contents:	Hours
Unit 1] String Concept **String Concept** • String Basics • String Methods ,String Buffer ,String Builder , Collection Framework - Collection Basics - Methods of Collection Interface List ,Array List Linked List ,Vector ,Set , Hash Set ,Tree Set ,Map, Hash Map ,Tree Map, Hash table	3
Unit 2] Thread Concept Lifecycle, Extends Thread, Implement Runnable Interface, Thread Priorities Thread Methods, Multithreading, Thread Synchronization,Object Locking, Inter Thread Communication	3
Unit 3 Mongo DB: Mongo DB Introduction, Mongo DB Features, Mongo DB Database ,Mongo DB Collection ,Spring Boot with Mongo DB Integration ,	3
Unit 4 Spring Boot with Mongo DB API Creation, Spring Boot with Mongo DB SignUp	SignIn Spring Boot with Mongo DB HRM Application	3
Unit 5React JS Basics ,React JS Features ,React JS Setup and Hello World Application, React JS JSX ,React JS ES , Features ,React JS Component ,React JS State	3
Unit 6 WEB SERVICES :Restful Web Service	3

Text Book/ Reference Book:

Colin Ihrig, Full Stack JavaScript Development With MEAN: MongoDB, Express,AngularJS, and Node.JS, SitePoint; 1st Edition.2. https://www.w3schools.com/whatis/whatis_fullstack.asp.3. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide toCreating Dynamic

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Websites, O'Reilly Media; 3rd edition,

4. CallumMacrae, Learning from jQuery, O'Reilly Media.

AD606	PCC	Machine learning Lab	0-2-0	1 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 2hrs/week Tutorial: ---	CA I:15MarksCAI I:15Marks EndSemesterExam:20

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

CO1	Make use of basics of machine learning to perform classification algorithms
CO2	Choose & differentiate different supervised learning algorithms for solving the problems
CO3	Solve the problems by making use of concepts of neural networks
CO4	Identify suitable hypothesis by choosing correct theory among different theories
CO5	Choose and apply clustering algorithm and identify its applicability in real life problems

Course Outcomes	ProgramOutcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	1	-	1	1	1	1	2	2	2	2
CO2	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2
CO3	2	2	2	2	2	1	-	1	1	1	2	2	2	2	2

| ·CO4 | 2 | 2 | 2 | 2 | 2 | 1 | - | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| CO5 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |

Experiment List
1) Linear Regression
2) Decision Tree
3) K nearest neighbor
4) Recommendation System
5) Bayes Theorem
6) Support Vector Machine
7) Logistic Regression
8) Back propagation
9) Ensemble Learning
10) K means Clustering

AD604A	PCC	Web Technology Lab	0-2-0	1 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 2hrs/week Tutorial	CA I:15 MarksCAII:1 5Marks EndSemesterExam: 20Marks

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

CO1	Use LAMP Stack for web applications
CO2	Use Tomcat Server for Servlets and JSPs
CO3	Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
CO4	Connect to Database and get results
CO5	Parse XML files using Java (DOM and SAX parsers)

Experiment List

1. Design the static web pages required for an online book store web site.
2. Write JavaScript to validate the fields of the Registration page
3. Develop and demonstrate the usage of inline, internal and external style sheet using CSS

4. Develop and demonstrate JavaScript with POP-UP boxes and functions .5) Write an HTML page that contains a selection box with a list of 5 countries. When the User selects a country, its capital should be printed next in the list. Add CSS to customize The properties of the font of the capital (color,bold and font size).
5. Write an HTML page including any required JavaScript that takes a number from text
6. Field in the range of 0 to 999 and shows it in words. It should not accept four and above
7. Digits, alphabets and special characters.
8. Develop and demonstrate PHP Script for the following problems:
9. Write a PHP Script to find out the Sum of the Individual Digits.
10. Write a PHP Script to check whether the given number is Palindrome or not

AD604B-	PCC	React JS		0-2-0	1 Credits
Teaching Scheme:			**Examination Scheme:**		
Lecture: 2hrs/week Tutorial			CA I:15 MarksCAII:1 5Marks EndSemesterExam: 20Marks		

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

CO1	Build Search filter in React
CO2	Design Simple counter exercise
CO3	Build Accordion in React Image Slider using React JS
CO4	Design Simple Login form in React
CO5	Demonstrate Print data from REST API
CO6	Design Multi-Page navigation using React Router

Course Contents:

1 Build Search filter in React

2. Simple counter exercise

3. Display a list in React

4. Build Accordion in React   Image Slider using React JS

5.Simple Login form in React

6 .Print data from REST API

7.Context API in React Components

8 .Multi-Page navigation using React Router

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T.Y. (AI &DS Engineering) Semester VI

AD604c	PCC	Angular JS		0-2-0	1 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 2hrs/week Tutorial	CA I:15 MarksCAII:15 Marks EndSemesterExam: 20Marks

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

CO1	Design number expressions in angularjs
CO2	Develop Angularjs various string expressions
CO3	Develop Angularjsjson object expression
CO4	Design Angular Directories
CO5	Demonstrate Filters in angularjs, angularjs filter example in controller
CO6	Demonstrate Angularjs filter orderby example, Angularjs filter orderby descending / ascending

Course Contents:
1.Write a program to Use number expressions in angularjs.
2. Implement Angularjs string expressions for concatenation, AngularJS string expressions for string comparison
3.Implement Angularjsjson object expression
4.Implement Angularjs array expression to check if array contains data, Angularjs expression to check if array empty
5.ImplementDirectives in angularjs with example
6. Program To demonstrate Filters in angularjs, angularjs filter example in controller

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7.Program to demonstrate Angularjs format date using date filter , Angularjs change date format with date filter example

8.Program to demonstrate Angular filter order by example, Angularjs filter orderby descending / ascending

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Mega Project Phase-I

PRJ05	PROJ	Mega Project Phase-I	0-0-4	2 Credits

Teaching Scheme:	Examination Scheme:
Lecture: -	Continuous Assessment 1: 25 Marks
Practical:	Continuous Assessment 2: 25 Marks
	End Semester Examination: 50 Marks

Pre-Requisites: All courses

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

CO1	State the exact title of the project and problem definition.
CO2	Explain the motivation, objectives and scope of the project.
CO3	Review the literature related to the selected topic of the project.
CO4	Design the mechanism, components of the system and prepare detailed drawings.
CCO5	Evaluate the cost considering different materials/manufacturing processes.

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The students in a group of not more than FOUR will work under the guidance of the faculty member on the project work undertaken by them. The completion of work, the submission of the report and assessment should be done at the end of VII Sem.

The project work should consist of any of the following or appropriate combination:

1. A comprehensive and up-to-date survey of literature related to study of a phenomenon or product.
2. Design of any equipment and / or its fabrication and testing.
3. Critical Analysis of any design or process for optimizing the same.
4. Experimental verification of principles used in applications related to variousspecializations related to Mechanical Engineering.
5. Software development for particular applications.
6. A combination of the above.

It is expected that the students should complete at least 50% of the total project work in VI Semester. The objective is to prepare the students to examine any design or process or phenomenon from all angles, to encourage the process of independent thinking and working and to expose them to industry. The students may preferably select the project works from their opted elective subjects. The students should submit the report in a prescribed format, before the end of VII semester. The report shall be comprehensive and presented typed on A4 size sheets and bound. Number of copies to be submitted is number of students plus two. The assessment would be carried out by the panel of examiners for both, term work and oral examinations.

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T.Y. (AI &DS Engineering) Semester VI

HMS07	HSMC		Aptitude Skills-IV	1-0-0	Audit

Teaching Scheme	Examination Scheme
Lecture:1hr/week	CA I:25 MarksCAII:25 Marks

Pre-Requisites: Communication Skills, Aptitude Skills I, II

Course Outcomes: At the end of the course students will be able to:

CO1	Solve the problems on system of equation.
CO2	Solve the problems on seating arrangement.
CO3	Solve the logical reasoning problems.
CO4	Solve the critical analysis problems.
CO5	Solve the problems of Data interpretation

CO6	Solve the problems mensuration's.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Course Contents:

Unit 1: System of equations	[2]
quadratic equations, Surds and indices, solution of equations, Ages	
Unit 2: Seating Arrangements	[2]
Linear seating Arrangement, Circular seating arrangement, Complex seating arrangement,	
Unit 3: Logical Reasoning	[2]
Numerical based on sense of direction, Blood relations, Odd man Out	
Unit 4: Critical analysis	[2]
Clocks and Calendar based problems, Crypt arithmetic, heights and distances	
Unit 5: Data Interpretation	[2]
Table form, Bar form, Line for Pi chart form	
Unit 6: Mensuration's	[2]
2D mensuration's and 3D mensuration's, venn diagram	

Text Books:
1. RS Aggarwal "A Modern Approach to Verbal & Non-Verbal Reasoning ",S. Chand Publisher; 2016 edition
2. RS Aggarwal, " Quantitative Aptitude for Competitive Examinations ", S. Chand Publisher; 2016 edition
3. Raymond Murphy "Essential English Grammar with Answers", Murphy

Reference Books:
1. Rao N,D,V,Prasada, Wren & Martin High School English Grammar and Composition Book, S Chand Publishing, 2017
2. Murphy, Intermediate English Grammar with Answers, Cambridge University Press;Second edition
3. RS Aggarwal, Objective General English, S. Chand Publisher; 2016 edition

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Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

T.Y. (AI &DS Engineering) Semester VI

HMS08	HSMC	Language Skills-IV	0-0-2	1 Credit

Teaching Scheme	Examination Scheme
Practical:2 hrs/week	CA I:25 MarksCAII:25 Marks

Pre-Requisites: Language Skills I, II

Course Outcomes: At the end of the course students will be able to:

CO1	Make use of functions in python programming.
CO2	Make use of python collections.
CO3	Elaborate classes and its objects in python.
CO4	Elaborate file & its handling functions.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	P
CO1	1	1	1	-	1	-	-	-	1	1	1	1	-	-	
CO2	1	1	2	1	1	-	-	-	1	1	2	1	-	-	
CO3	1	1	2	1	1	-	-	-	1	1	2	1	-	-	
CO4	1	1	2	1	1	-	-	-	1	1	2	1	-	-	

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Course Contents:

Unit 1: Function Why we Need Function ,Categories of Functions-Predefined ,User-define ,Parts of Functions Arguments, Return Value ,Definition of Function ,Function Calling ,Lambda(Introduction)	[6]
Unit 2 :Python Collections List, tuple, set, dictionary,constructor ,check, change ,remove item ,list comprehension ,Sort ,loop through ,joining	[6]
Unit 4: Class and Object OOP Characteristics ,creating class ,__init__() method, creating Object ,accessing methods and variables of class ,constructor and destructor ,inheritance ,super(),function overloading	[6]
Unit 4: File handling Path & Directory Settings-Absolute,Relative,File Modes(r,w,a,etc),Open & Close file Reading File using Python--Read Line By Line readline() function,ReadWord,Read character(offset),Writing Text File using Python--Write Mode,Append Mode, Exception handling.	[6]

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Internship/Field Training

IFT02	PROJ	Internship/Field Training	0-0-0	Audit

Teaching Scheme:	Examination Scheme:
Lecture: -	
Practical:	End Semester Examination : 50 Marks

Pre-Requisites: Basic knowledge of all courses

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

Course Description:-Internship / Training is educational and career development opportunity, providing practical experience in a field or discipline. At the end of the **Fourth and Fifth semester**, every student should undergo practical training in an industry / professional organization / Research laboratory with the prior approval of the HoD/TPO/Principal of the college and submit the report along with thecompletion certification from the Industry/ Organization. The report will be evaluated during the **Sixth**semester by the department.

Course Learning Outcomes:-

After successful completion of the course, students will be able to

1. Verify the Technical knowledge in real industrial situations.

2. Develop interpersonal communication skills.

3. Discuss activities and functions of the industry in which the Internship/training has done.

4. Write the technical report.

Prerequisite: - Basics of Mechanical Engineering, Good written and Oral Communication.

Guideline for Students:-

1. Arrive at work as per schedule, ready to work and stay for the agreed upon time.

2. Present yourself in a professional manner at all times, including being appropriately dressed at workplace.

3. Communicate any concerns with your supervisor and the internship/Training coordinator in a timely manner and respectfully.

4. Demonstrate enthusiasm and interest in what you are doing, ask questions and take the initiative as appropriate.

5. Complete and submit assigned tasks by designated timelines. Meet all deadlines.

Student's Diary/ Daily Log
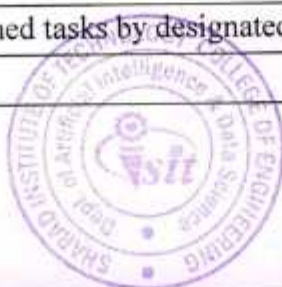
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The main purpose of writing daily diary is to cultivate the habit of documenting and to encourage the students to search for details. It develops the students' thought process and reasoning abilities. The students should record in the daily training diary the day to day account of the observations, impressions, information gathered and suggestions given, if any. It should contain the sketches & drawings related to the observations made by the students.

The daily training diary should be signed after every day by the supervisor/ in charge of the section where the student has been working. The diary should also be shown to the Faculty Mentor.

Student's Diary and Internship Report should be submitted by the students along with attendance record and an evaluation sheet duly signed and stamped by the industry to the SITCOE immediately after the completion of the training. It will be evaluated on the basis of the following criteria:

- Regularity in maintenance of the diary.
- Adequacy & quality of information recorded.
- Drawings, sketches and data recorded.
- Thought process and recording techniques used.
- Organization of the information.

Internship Report

After completing the internship, the student should prepare a comprehensive report to indicate what he/she has observed and learned in the training period. Daily diary will also help to a great extent in writing the industrial report since much of the information has already been incorporated by the student into the daily diary. The competent authority should sign the training report. The Internship report should be evaluated on the basis of following criteria:

i.	Originality.
ii.	Adequacy and purposeful write-up.
iii.	Organization, format, drawings, sketches, style, language etc.
iv.	Variety and relevance of learning experience.
v.	Practical applications, relationships with basic theory and concepts taught in the course.

Evaluation of Internship/Training

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