RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, V-Semester

AD-501 Theory of Computation

COURSE OBJECTIVES:

This course will help students to learn several formal mathematical models of computation along with their relationships with formal languages and grammars. Students will also learn about solvable and unsolvable problems.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Compare and analyze different theoretical computational models, languages and grammars.
2. Design and construct finite automata, pushdown automata and Turing machine for various problems.
3. Identify limitations of some computational models and possible methods of proving them.
4. Describe the concept of computable and non-computable problems.

Unit-I

Introduction of Automata Theory: Review of Sets, Mathematical formal proofs including proof by induction and by contradiction,Introduction to languages, grammars and automata: Alphabet, Representation of language and grammar, Types of Automata, Finite Automata as a language acceptor and translator, Moore machines and mealy machines, composite machine, Conversion from Mealy to Moore and vice versa.

Unit-II

Types of Finite Automata: Non Deterministic Finite Automata (NDFA), Deterministic finite automata machines, conversion of NDFA to DFA, minimization of automata machines, regular expression, applications of regular expressions, Arden's theorem. Meaning of union, intersection, concatenation and closure, 2 way DFA.

Unit-III

Grammars: Types of grammar, context sensitive grammar, and context free grammar, regular grammar. Derivation trees, ambiguity in grammar, simplification of context free grammar,conversion of grammar to automata machine and vice versa, Chomsky hierarchy of grammar, Chomsky normal form and Greibach normal form.

Unit-IV

Push down Automata: example of PDA, deterministic and non-deterministic PDAs, Context Free Grammar, Parsing, Ambiguity, Normal form of CFGs, CFG to NPDA, NPDA to CFGs CFG equivalent to PDA, Petri nets model.

Unit-V

Turing Machine: Turing Machine as acceptor, Recognizing a Language, Universal TMs, Linear Bounded Automata, Context Sensitive Languages, Recursive and Recursively Enumerable Languages, Unrestricted Grammars. Halting problem of Turing machine & the post correspondence problem, Concept of Solvability and Unsolvability, Church's Thesis, Complexity Theory – P and NP problems.

RECOMMENDED BOOKS

1. Hopcroft, Ullman, Motwani, "Introduction to Languages, Automata and Computation", 3rd Edition, Pearson Education, 2008.
2. John C. Martin, "Introduction to Languages and the Theory of Computation", Fourth Edition, Mc Graw Hill, 2010.
3. Peter Linz, "An Introduction to Formal Languages and Automata", Sixth Edition, Jones and Bartlett, 2016.
4. Lewis and Papadimitiriou, "Elements of Theory of Computation", Second Edition, Pearson Education, 2015.
5. K.L.P. Mishra and N. Chandrasekaran, "Theory of Computer Science: Automata, Languages and Computation", Third Edition, Prentice Hall, 2006.
6. Cohen John, "Introduction to Computer Theory", Second Edition, Wiley and Sons, 2007.
7. Theory of Computation, Wood, Harper & Row.

LIST OF EXPERIMENTS

1. Design a Program for creating machine that accepts three consecutive one.
2. Design a Program for creating machine that accepts the string always ending with 101.
3. Design a Program for Mode 3 Machine
4. Design a program for accepting decimal number divisible by 2.
5. Design a program for creating a machine which accepts string having equal no. of 1's and 0's.
6. Design a program for creating a machine which count number of 1's and 0's in a given string.
7. Design a Program to find 2's complement of a given binary number.
8. Design a Program which will increment the given binary number by 1.
9. Design a Program to convert NDFA to DFA.
10. Design a Program to create PDA machine that accept the well-formed parenthesis.
11. Design a PDA to accept WCWR where w is any string and WR is reverse of that string and C is a Special symbol.
12. Design a Turing machine that's accepts the following language $a^n b^n c^n$ where n>0.

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Artificial Intelligence and Data Science, V-Semester

AD -502 Machine Learning,

COURSE OBJECTIVES:

The objective of this course is to impart necessary knowledge of different machine learning techniques and develop programming skills required to build machine learning based applications.

COURSE OUTCOMES:

After completing the course student should be able to:

1. Describe in-depth about theories, methods, and algorithms in machine learning.
2. Find and analyze the optimal hyper parameters of the machine learning algorithms.
3. Examine the nature of a problem at hand and determine whether machine learning can solve it efficiently.
4. Solve and implement real world problems using machine learning.

COURSE CONTENTS:

UNIT-I

Introduction to machine learning, Machine learning life cycle, Types of Machine Learning System (supervised and unsupervised learning, Batch and online learning, Instance-Based and Model based Learning), scope and limitations, Challenges of Machine learning, data visualization, hypothesis function and testing, data pre-processing, data augmentation, normalizing data sets, , Bias-Variance tradeoff, Relation between AI (Artificial Intelligence), ML (Machine Learning), DL (Deep Learning) and DS (Data Science).

UNIT-II

Clustering in Machine Learning: Types of Clustering Method: Partitioning Clustering, Distribution Model-Based Clustering, Hierarchical Clustering, Fuzzy Clustering. Birch Algorithm, CURE Algorithm. Gaussian Mixture Models and Expectation Maximization. Parameters estimations – MLE, MAP. Applications of Clustering.

UNIT-III

Classification algorithm: - Logistic Regression, Decision Tree Classification, Neural Network, K-Nearest Neighbors (K-NN), Support Vector Machine, Naive Bayes (Gaussian, Multinomial, Bernoulli). Performance Measures: Confusion Matrix, Classification Accuracy, Classification Report: Precisions, Recall, F1 score and Support.

UNIT-IV

Ensemble Learning and Random Forest**:** Introduction to Ensemble Learning, Basic Ensemble Techniques (Max Voting, Averaging, Weighted Average), Voting Classifiers, Bagging and Pasting, Out-of-Bag Evaluation, Random Patches and Random Subspaces, Random Forests (Extra-Trees, Feature Importance), Boosting (AdaBoost, Gradient Boosting), Stacking.

UNIT-V

Dimensionality Reduction:The Curse of Dimensionality, Main Approaches for Dimensionality Reduction (Projection, Manifold Learning) PCA: Preserving the Variance, Principal Components, Projecting Down to d Dimensions, Explained Variance Ratio, Choosing the Right Number of Dimensions, PCA for Compression, Randomized PCA, Incremental PCA. Kernel PCA: Selecting a Kernel and Tuning Hyper parameters. Learning Theory: PAC and VC model.

REFERENCE BOOKS:

1. Tom M. Mitchell, “Machine Learning”, McGraw Hill Education, First edition, 2017.
2. Aurelien Geon, “Hands-On Machine Learning with Scikit-Learn and Tensorflow: Concepts, Tools, and Techniques to Build Intelligent Systems”, Shroff/O'Reilly; First edition (2017).
3. Andreas Muller, "Introduction to Machine Learning with Python: A Guide for Data Scientists", Shroff/O'Reilly; First edition (2016).
4. Leonard Kaufman and P. J. Rousseau. Finding groups in data: An introduction to cluster analysis, Wiley, 2005
5. NelloCristianini and John Shawe-Taylor, An Introduction to Support Vector Machines, Cambridge University Press, 2000.

PRACTICAL:

Different problems to be framed to enable students to understand the concept learnt and get hands-on on various tools and software related to the subject. Such assignments are to be framed for ten to twelve lab sessions.

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New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, V-Semester

AD 503 (A) Internet and Web Technology

COURSE CONTENTS:

UNIT-I

Introduction: Concept of WWW, Internet and WWW, HTTP Protocol: Request, Response, header and methods. Web browser and Web servers, Features of Web 2.0 Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Web site, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation.

UNIT-II

HTML :Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Web Sockets: Overview and features of HTML5. MIME type and content encoding, Session tracking and Cookies. Browser: Working of a Browser, Plug-ins; Search Engines. Client Side Programming: Java Script, JavaScript Regular expressions, web servers.

UNIT-III

Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3 JavaScript : Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: JavaScript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations, DHTML : Combining HTML, CSS and JavaScript, Events and buttons.

UNIT-IV

XML : Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT

PHP: Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP.

UNIT-V

PHP and MySQL: Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database error handling. Case study: Web based application development.

Books Recommended:

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2. Moller, "An Introduction to XML and Web Technologies", Pearson Education, 2012
3. Web Technologies, Black Book, dreamtech Press
4. HTML 5, Black Book, dreamtech Press
5. Web Design, Joel Sklar, Cengage Learning
6. Harwani, Developing Web Applications in PHP and AJAX, McGrawHill
7. Internet and World Wide Web How to program, P.J. Deitel& H.M. Deitel , Pearson

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, V-Semester

AD 503 (B) Computer Graphics & Multimedia

COURSE OUTCOMES: After Completing the course student should be able to:

CO1: Describe input/output devices and their working principles along with the understanding of drawing algorithms.

CO2: State basic principles of 2D and 3D geometric transformations and summarize typical graphics pipeline

CO3: State the importance of viewing and projections, also understanding of curve generation algorithms.

CO4: Articulate various algorithms for scanning, filling, clipping and detecting visible surfaces.

CO5: Comprehend the fundamentals of animation, animation sequence, various audio, video, text, animation file formats and compression technique.

COURSE CONTENTS:

UNIT-I

Introduction to Raster Scan displays, Pixels, Frame buffer, Vector & Charactergeneration, Random Scan systems, Display devices, Scan Conversion techniques, Line Drawingalgorithms: simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms: Midpoint Circledrawing and Bresenham's Algorithm, Polygon fill algorithm: Boundary-fill and Flood-fillalgorithms.

UNIT-II

2-D Transformation: Translation, Rotation, Scaling, Shearing, Reflection. InverseTransformation, Homogeneous coordinate system, Matrices Transformation, CompositeTransformation. Windowing & Clipping: World Coordinate System, Screen Coordinate System,Viewing Transformation, Line Clipping & Polygon Clipping Algorithms

UNIT-III

3-D Transformations: Translation, Rotation and Scaling. Parallel & PerspectiveProjection: Types of Parallel & Perspective Projection, Hidden Surface elimination: Depthcomparison, Back face detection algorithm, Painter's Algorithm, Z-Buffer Algorithm. Curvegeneration, Bezier and B-spline methods. Basic Illumination Model: Diffuse reflection, Specularreflection, Phong Shading, Gouraud shading, Ray Tracing, Color models like RGB, YIQ, CMY,HSV.

UNIT-IV

Visualization: Visualization of 2D/3D scalar fields: color mapping, ISO surfaces. Directvolume data rendering: ray-casting, transfer functions, segmentation. Visualization of Vectorfields and flow data, Time-varying data, High-dimensional data: dimension reduction, parallelcoordinates, Non-spatial data: multi-variate, tree/graph structured, text Perceptual and cognitivefoundations, Evaluation of visualization methods, Applications of visualization, Basic AnimationTechniques like traditional, key framing.

UNIT –V

Multimedia: Basic of multimedia, application of Multimedia, Text-Types, UnicodeStandard, text Compression, Text file formats, Audio Components, Digital Audio, Digital Audioprocessing, Sound cards, Audio file formats ,Audio Processing software ,Video-Video colorspaces, Digital Video, Digital Video processing, Video file formats. Animation: Uses of
Animation, Principles of Animation, Computer based animation, 3D Animation, Animation fileformats, Animation software, Special Effects in animation, Storyboarding for Animation,
Compression: Lossless/Lossy Compression techniques, Image, Audio & Video Compression, MPEG Standards, Multimedia Architecture, Multimedia databases.

Recommended Text:

1. Donald Hearn and M.P. Becker “Computer Graphics” Pearson Pub.
2. Foley, Van Dam, Feiner, Hughes, “Computer Graphics: Principles and Practice” Addison-Wesley
3. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill
4. Parekh “Principles of Multimedia” Tata McGraw Hill
5. Maurya, “Computer Graphics with Virtual Reality System “, Wiley India
6. Pakhira,”Computer Graphics, Multimedia& Animation”,PHI learning
7. Andleigh, Thakral , “Multimedia System Design “ PHI Learning
8. Khalid Sayood , “Introduction to Data Compression”, Morgan Kaufmann

SUGGESTED LIST OF EXPERIMENTS FOR DEPARTMENTAL ELECTIVE LAB

1. Write a program to draw a line using DDA algorithm.

2.Write a program to draw a line through Bresenham’s algorithms

3.Write a program to draw a line using Mid-Point algorithm.

4. Write a Program for drawing a circle using Bresenham’s line drawing algorithm

5. Write a Program to implementTranslation ofa line and triangle

6. Write a Program to implement Scaling of a lineand triangle.

7. Write a Program to implement Rotation of a lineand triangle .

8.Write a Program showing line clipping using cohen -sutherland line clipping algorithm.

9.Write a program on Boundary fill and flood fill algorithm implementation.

10.Write a program for performing the basic transformations such as translation, Scaling, Rotation for a given 3D object.

11. Write a Program on Bezier methods for drawing curves.

12. Using Flash/Maya perform different operations (rotation, scaling move etc.) on objects.

13. Create a Bouncing Ball using Key frame animation and Path animation.

14.Create animations using Adobe FLASH. Flash Drawing and Painting Tools. Flash Drawing Modes. Pencil Tools.

15.To create a Jpeg image that demonstrates the various features of an image editing tool.

16. To develop a presentation for a product using techniques like Guide Layer, masking and onionSkin using authoring tools.

17. To perform basic operations on image using any image editing software.

18. Draw a colour cube and spin it using OpenGL transformation matrices.

19. To Create Animation using any authoring tool.

20. Write a program to play “wave” or “MIDI “file format sound files.

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New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, V-Semester

AD 503 (C) Computer Org. & Architecture

COURSE OUTCOMES: After Completing the course student should be able to:

CO1: Ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

CO2: Design and analyze algorithms used for performing binary arithmetic calculations

CO3: Comprehend to understand the Input Output organization for computer system.

CO4: Design memory elements such as registers and RAM using flip flops and understanding of memory organization for Computer.

CO5: Develop the ability to determine the applicability of pipelining Vector processing and RISC/CISC architectures

COURSE CONTENTS:

UNIT-I

Basic Structure of Computer: Structure of Desktop Computers, CPU: General RegisterOrganization-Memory Register, Instruction Register, Control Word, Stack Organization,Instruction Format, ALU, I/O System, bus, CPU and Memory Program Counter, BusStructure, Register Transfer Language-Bus and Memory Transfer, addressing modes.Control Unit Organization: Basic Concept of Instruction, Instruction Types, MicroInstruction Formats, Fetch and Execution cycle, Hardwired control unit, Microprogrammed Control unit microprogram sequencer Control Memory, Sequencing and Execution of Micro Instruction.

UNIT-II

Computer Arithmetic: Addition and Subtraction, Tools Compliment Representation,Signed Addition and Subtraction, Multiplication and division, Booths Algorithm,Division Operation, Floating Point Arithmetic Operation, design of Arithmetic unit

UNIT-III

I/O Organization:I/O Interface –PCI Bus, SCSI Bus, USB, Data Transfer: Serial, Parallel, Synchronous, Asynchronous Modes of Data Transfer, Direct MemoryAccess(DMA), I/O Processor.

UNIT-IV

Memory Organization: Main memory-RAM, ROM, Secondary Memory –MagneticTape, Disk, Optical Storage, Cache Memory: Cache Structure and Design, MappingScheme, Replacement Algorithm, Improving Cache Performance, Virtual Memory,memory management hardware.

UNIT-V

Multiprocessors: Characteristics of Multiprocessor, Structure of Multiprocessor-Interprocessor Arbitration, Inter-Processor Communication and Synchronization. Memoryin Multiprocessor System, Concept of Pipelining, Vector Processing, Array Processing,RISC And CISC, Study of Multicore Processor –Intel, AMD.

Reference Books:

1.Morris Mano , “Computer System Organization ”PHI

2.Alan Clements: “Computer Organization and Architecture”, Cengage Learning

3.Subrata Ghosal: “Computer Architecture and Organization”, Pearson

4.William stalling ,“Computer Architecture and Organization” PHI

5.M. Usha, T.S. Shrikant: “Computer System Architecture and Organization”, Willey India

6.Chaudhuri, P.Pal: “Computer Organization and Design”, PHI

7.Sarangi: “Computer Organization and Architecture”,Mc-Graw Hills

SUGGESTED LIST OF EXPERIMENTS FOR DEPARTMENTAL ELECTIVE LAB

1. Study of Multiplexer and Demultiplexer

2. Study of Half Adder and Subtractor

3. Study of Full Adder and Subtractor

4. WAP to add two 8 bit numbers and store the result at memory location 2000

5. WAP to multiply two 8 bit numbers stored at memory location 2000 and 2001 andstores the result at memory location 2000 and 2001.

6. WAP to add two 16-bit numbers. Store the result at memory address starting from2000.

7. WAP which tests if any bit is '0' in a data byte specified at an address 2000. If it is so,00 would be stored at address 2001 and if not so then FF should be stored at the sameaddress.

8. Assume that 3 bytes of data are stored at consecutive memory addresses of the datamemory starting at 2000. Write a program which loads register C with (2000), i.e.with data contained at memory address2000, D with (2001), E with (2002) and A with(2001).

9. Sixteen bytes of data are specified at consecutive data-memory locations starting at2000. Write a program which increments the value of all sixteen bytes by 01.

10. WAP to add t 10 bytes stored at memory location starting from 3000. Store the resultat memory location 300A

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Artificial Intelligence and Data Science, V-Semester

AD 504 (A) Management Information System

UNIT-I

Basic Concepts of MIS, Data v/s Information, Organization Structures, Business Process, Role of the MIS, Importance, Scope, Impact and Advantagesof the MIS, MIS: a support to management, Structure/Architecture of MIS, Classification of MIS based on information characteristics, application, and business function.

UNIT-II

Resources and Components of Information Systems, Managing Information Resources in an Organization, IT infrastructure and upcoming technologies, Integration and automation of Business Functions and developing Business Models. Fundamentals of Data Processing.

UNIT-III

Information System Development: SDLC, Models and approaches to System development, Information System Planning, System Analysis and Design- Need for System Analysis,Analysis of the existing system, Analysis of new requirements; System Development; System Implementation; Factors responsible for success and failure of Information Systems.

UNIT-IV

Information System Applications: Business Applications, Decision Support Systems (DSS)- Characteristics, Problem Analysis v/s Decision making, DSS applications in E enterprise, Knowledge Management System and Knowledge Based Expert System, Enterprise Model System and E-Business, ERP systems, E-Commerce, E-communication; Business Process Reengineering.

UNIT-V

Evaluation and Maintenance of MIS, Protecting the Information Systems- Security challenges in E-enterprises; Security threats, vulnerability, and safeguards, Controlling security threat and vulnerability, Technologies for Information System

Control, Disaster Recovery Plans. Emerging trends and technologies with regard to Management Information Systems.

Books Recommended:

1. Jawadekar, W.S., “Management Information Systems”, Tata McGraw Hill.

2. Kenneth C. Laudon and Jane P. Laudon: “Management Information Systems” ,Pearson Education.

3. Stephen Haag, M. Cummings, Donald J McCubbrey, “Management Information Systems for the Information Age”, McGrawHill.

4. Goyal, D.P.: “Management Information System”, Macmillan India.

5. MahadeoJaiswal, Monika Mital: “Management Information System”, Oxford University Press.

6. Murthy C.S.V.: “Management Information System”, Himalaya Publications

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New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, V-Semester

AD 504 (B) Game Theory with Engineering Applications

COURSE OUTCOMES: After Completing the course student should be able to:

CO1. Relate the basic concepts and fundamentals of Game.
CO2. Understand and comprehend the design process for any game.
CO3. Develop a level of interactivity and choice for Game approach.
CO4. Understand the conceptual framework for digital games.
CO5. Apply the strategy for different games.

COURSE CONTENTS:

UNIT-I

Overview: What is a Game, Game Design Schema, Game Design fundamentals,Engineering application of game theory, Design Process: Iterative design, Commissions,Design & Testing of the Board Game, Introduction to meaningful play, two kinds ofmeaningful play- discernable & integrated.

UNIT-II

Introducing design, design & meaning, Semiotics: A brief overview, four semioticConcepts, Context Shapes interpretations.

UNIT-III

Introduction to Systems, elements of a System, Framing Systems, open & closed systems,Introduction to Interactivity, a multivalent model of interactivity, interaction & choice,choice molecules, anatomy of choice, space of possibility.

UNIT-IV

Defining games: overview of digital games, magic circle. Primary Schemas: conceptualframework, rule, play, culture.

UNIT-V

Rules: defining rules, a deck of cards, quality of rules, rules in context, Rules on threelevels: Operational, Constituative, Implicit, Identity of a Game, Specificity of Rules,Rules of Digital games. Case Studies: Tic Tac Toe, Deck of Cards.

TEXT BOOKS RECOMMENDED:-

1. Brathwaite, Brenda, and Ian Schreiber. Challenges for Game Designers: Non-digitalExercises for Video Game Designers. Boston, MA: Charles River Media/CourseTechnology, 2009. ISBN: 97815845058081

2. Game Design Workshop: A Playcentric Approach to Creating Innovative Games byTracy Fullerton. ISBN-10: 1482217163.

3. Challenges for Game Designers by Brenda Brathwaite (now: Romero) and Ian Schreiber.ISBN-10: 158450580X

REFERENCE BOOKS:-

1. Rules of Play - Game Design Fundamentals, Katie Salen and Eric Zimmerman, The MITPress Cambridge, Massachusetts London, England, book design and photography.

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New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, V-Semester

AD 504 (C) Operations Research

COURSE OUTCOMES: After Completing the course student should be able to:

CO1: Develop the concepts and able to formulate and solve Linear Programming Problems.
CO2: Design an optimal solution for transportation & Assignment Problem
CO3:Identify &analyze the scheduling of activities using PERT and CPM techniques.
CO4:Understand Job sequencing problems and the use of Dynamic programming in OR.
CO5: Develop a solution for queuing models.

COURSE CONTENTS:

UNIT-I

Origin & Development of OR, Different Phases of OR study, Methodology of OR, Scope andLimitations of OR, OR in decision making. Linear Programming: Introduction – Mathematical formulation of a problem –Graphical solutions, standard forms the simplex method for maximization andminimization problems, Interpretationof Duality, Dual simplex Method.

UNIT-II:

Transportation problem (TP) and its formulation. Finding basic feasible solution and optimal solution for transportation problem.

Assignment problem and its formulation, Hungarian methodfor solving Assignment problem, travelling salesmen problem.

UNIT-III

Project Scheduling: PERT and CPM with known activity times. Critical Path Analysis,Various types of floats. Probability considerations in PERT. Updating of PERT charts.Project crashing. Formulation of CPM as a linear programming problem. Resource levellingand resource scheduling.

UNIT-IV

Sequencing problem: Introduction to sequencing problem. Flow shop problem: Processing njobs through 2, 3 and m machines. General n/m job-shop problem.

Introduction to Dynamic Programming. Dynamic Programming Approach for solving Linear ProgrammingProblem. Applications of Dynamic programming.

UNIT-V

Queuing: Introduction to queuing theory, Queuing systems and their characteristics, Pure-birth and Pure-deathmodels, Kendall & Lee's notation of Queuing, empirical queuing models – Numerical on M/M/1 and M/M/C Queuing models.

TEXT BOOKS:

1. Operations Research, P K Gupta and D S Hira, S. Chand and Company LTD. Publications,New Delhi – 2007

2. Operations Research, An Introduction, Seventh Edition, Hamdy A. Taha, PHI PrivateLimited, 2006.

REFERENCE BOOKS:

1. Operations Research, Theory and Applications, Sixth Edition, J K Sharma, Trinity Press,Laxmi Publications Pvt. Ltd. 2016.

2. Operations Research, Paneerselvan, PHI

3. Operations Research, A M Natarajan, P Balasubramani, Pearson Education, 2005

4. Introduction to Operations Research, Hillier and Lieberman, 8th Ed., McGraw Hill

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New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, V-Semester

AD-506 - Linux Lab

COURSE OUTCOMES: After Completing the course student should be able to:

CO1. Understand the system calls

CO2. Compare between ANSI C AND C++ AND POSIX standards

CO3. Mapping the relationship between UNIX Kernel support for files

CO4. Understand Kernel support for process creation and termination and memory allocation

Overview of Unix/Linux:-Concepts, Unix/Linux Installation Process, Hardware requirements for Unix/Linux,Advantages of Unix/Linux, Reasons for Popularity and Success of Linux/Unix OperatingSystem, Features of Linux/Unix Operating System, Kernel, Kernel Functions

The Shell Basic Commands, Shell Programming:-Shell Variables, Branching Control Structures, Loop-Control Structure, Continue and breakStatements, Sleep Command, Debugging Script. Use of Linux as webserver,file server, directory server, application server, DNS server, SMTP server, Firewall,Proxy server.

File System: -Definition of File System, Defining Geometry, Disk Controller, Solaris File System, DiskBased File Systems, Network-Based File Systems, Virtual File systems, UFS File System,The Boot Block, The Super Block, The Inode, Tuning File System, Repairing File System.

Process Control:-Viewing a Process, Command to display Process, Process Attributes, Process States, ProcessFields, PS Commands options, PGREP, PRSTAT, CDE Process Manager, SchedulingProcess, Scheduling Priorities, Changing the Priority of a time-sharing process, KillingProcess.

System Security:-Physical Security, Controlling System Access, Restricted Shells Controlling File Access, FileAccess Commands, Access Control List(ACLs), Setting ACL Entries, Modifying ACLentries on a file, Deleting ACL entries on a file, Restricting FTP, Securing Super UserAccess, Restricting Root Access, Monitoring super user Access, TCP Wrappers.

Dynamic Host Configuration Protocol: -Introduction, DHCP Leased Time, DHCP Scopes, DHCP IP Address, Allocation Types,Planning DHCP Deployment, DHCP Configuration files, Automatic Startup of DHCPServer, Configuration of DHCP Clients, Manually Configuring the DHCP.

Case Study: -

Installation of Linux, Customization of Linux, Installation of SAMBA, APACHE,TOMCAT, Send MAIL, Postfix, Implementation of DNS, LDAP services, Firewall, Proxyserver

List of Experiments:-

1. To Study basic & User status Unix/Linux Commands.

2. Study & use of commands for performing arithmetic operations with Unix/Linux.

3. Create a file called wlcc.txt with some lines and display how many lines, words andcharacters are present in that file.

4. Append ten more simple lines to the wlcc.txt file created above and split theappended file into 3 parts. What will be the names of these split files? Display thecontents of each of these files. How many lines will be there on the last file?

5. Given two files each of which contains names of students. Create a program todisplay only those names that are found on both the files.

6. Create a program to find out the inode number of any desired file.

7. Study & use of the Command for changing file permissions.

8. Write a pipeline of commands, which displays on the monitor as well as saves theinformation about the number of users using the system at present on a file called usere.ux.

9. Execute shell commands through vi editor.

10. Installation, Configuration & Customizations of Unix/Linux.

11. Write a shell script that accepts any number of arguments and prints them in the reverseorder.

12. Write a shell script to find the smallest of three numbers that are read from the keyboard.

13. Write a shell script that reports the logging in of a specified user within one minute afterhe/she logs in. The script automatically terminates if the specified user does not login duringa specified period of time.

14. Installation of SAMBA, APACHE, TOMCAT.

15. Implementation of DNS, LDAP services,

16. Study & installation of Firewall & Proxy server

Suggested Reading:

1. Venkatesh Murthy, “Introduction to Unix &Shell”, Pearson Edu

2. Forouzan, “Unix &Shell Programming”, Cengage Learning

3. Sumitab Das,”Unix Concept & Application”,TMH

4. Gopalan, Shivaselvan,”Beginners Guide to Unix ” PHI Learning

5. Venkateshwavle,”Linux Programming Tools Unveil`ed”, BS Publication.

6. Richard Peterson,”Linux Complete Reference”,TMH

7. Richard Peterson,”Unix Complete Reference”,TMH