

BCA – Fifth Semester
CS – 504 – Introduction to Data Science
Max marks 50 Min Marks 17

Course Objectives (CoB): The course is aimed at

1. Building the fundamentals of data science.
2. Imparting design thinking capability to build big-data
3. Developing design skills of models for big data problems
4. Gaining practical experience in programming tools for data sciences
5. Empowering students with tools and techniques used in data science

Expected Course Outcome (CO): At the end of the course the student should be able to:

1. Apply data visualisation in big-data analytics
2. Utilise EDA, inference and regression techniques
3. Utilize Matrix decomposition techniques to perform data analysis
4. Apply data pre-processing techniques
5. Apply Basic Machine Learning Algorithms

CS – 504: Introduction to Data Science

Max. Marks: 50

Min Marks: 17

Course Objectives: The objective of the course is introducing and teach idea of Data Science and enable students to apply Data Science in real world. This course will help learning from data, in order to gain useful predictions and business decisions.

Learning Outcomes: It is expected that after completion of the course, students will able to

- 1) Learn the fundamentals of Data Science
- 2) Work with R to analyze structured and unstructured data.
- 3) Develop the ability to build and assess data-based models.
- 4) Predict outcomes with supervised and unsupervised machine learning techniques.

Unit I

Introduction: What is Data Science? The Data Science Process, Different Types of Data: Quantitative, Categorical. Graphical Summaries of Data: Pie Chart, Bar Graph, Pareto Chart, Histogram. Measuring the Center of Quantitative Data: Mean, Median, Mode. Measuring the Variability of Quantitative Data: Range, Standard Deviation, and Variance.

Unit II

Overview of R, R data types: Vectors, Matrices, Factors, Lists, Data Frames, reading and writing data, Control structures, functions, scoping rules, dates and times

Unit III

Introduction to Data Cleansing, Missing and Repeated Values, Feature Engineering, Outliers and Errors, Finding Outliers, Cleaning Data with R.

Unit IV

Machine Learning: Definition and overview, Regression, Simple Linear Regression, Multiple Regression, Assessing Performance, Ridge Regression, Feature Selection & Lasso, Nearest Neighbors & Kernel Regression

Unit V

Machine Learning: Classification, Linear Classifiers & Logistic Regression, Learning Linear Classifiers, Overfitting & Regularization in Logistic Regression, Decision Trees, Handling Missing Data, Boosting.

Text Books:

- 1) Allan G. Bluman, Elementary Statistics: A Step By Step Approach, 10th Edition, McGraw-Hill, 2017.
- 2) Paul Teator, R Cookbook, First Edition, O'Reilly Media, 2011.
- 3) Tom Mitchell, Machine Learning, First Edition, McGraw Hill, 1997.

BCA – Third Semester
BCA 304 – Unix Operating System
Max marks: 50 Min Marks :17

Course Objectives (CoB): The course is aimed at

1. To understand and make effective use of Unix/ linux utilities and shell scripting language to solve problems
2. To implement in C some standard Unix/linux utilities like mv,cp,ls etc...
3. To Develop the skills the necessary for systems programming including file system programming, process and signal management and inter-process communication
4. To develop the basic skills required to write network programs using sockets

Expected Course Outcome (CO): At the end of the course the student should be able to:

1. Explain the structure and functions of operating systems along with their components, types and working.
2. Make use of appropriate Unix/Linux commands for memory management, file management and directory management.
3. Analyze the performance of different scheduling algorithms along with the policies for concurrency and deadlock management.
4. Elaborate the system calls for process management and file management.
5. Understand the basic set of commands and editors in Linux operating system.

BCA-304: UNIX OPERATING SYSTEM

Max. Marks: 50

Min. Marks: 17

COURSE OBJECTIVES: To understand the fundamental design of Unix Operating System and to become familiar with the various commands used for file handling, general utility, filters, scheduling and system administration. The students will be familiarized with the shell programming.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Understand the basics of Unix operating system and its features and some general utility commands.
2. Learn about the command shell, create own commands by combining commands, use pipes and redirection, set and manipulate ownership and permissions of files and directories.
3. Extract information using simple and advanced filters, and shell process.
4. Learn communication and scheduling of jobs, Unix editor, and the shell script.
5. Understand UNIX system administration.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Unix operating system, background, philosophy, help facility, The file system, structure of file system, Basic Commands related to file system: pwd, cd, mkdir, rmdir, ls, cp, rm, mv, cat. General utility commands: banner, cal, date, who, who am i, echo, printf, bc, who, uname, tty, stty, passwd.

UNIT- II

Utilities: more, od, file, wc, cmp, comm, diff, tar commands. I/O redirection. The Bourne shell: sh preceding a command by its own combining commands, pattern matching, echo, pipes, tees, shell variables and shell scripts. Basic file attributes, chmod command.

UNIT- III

Simple filters: pr, head, tail, cut, paste, sort, uniq, nl commands. Advanced filters: grep, egrep, fgrep, tr, join, sed, awk, filtering. The process: shell process, parent and children process status, system processes, multiple jobs, foreground and background, wait commands, pre mature termination of process, job execution with low priority, multiple jobs in foreground, shell layers, timing processes.

UNIT- IV

Communication and scheduling, address all users, delay Execution of jobs-later, periodically. Introduction to vi editor, Programming with shell: system variable, profile, conditional execution, script termination, Conditional and loop control statements, set and shift statement.

UNIT- V

System Administration: installing hardware and software, super user, security, user services, management operation, files system, administration backups.

TEXT BOOKS

1. Sumitabha Das, "Unix : Concepts and Applications", Third Edition, 2006, Tata Mc-Graw Hill

REFERENCE BOOKS:

1. ISRD Group, Basics of OS, UNIX and SHELL Programming, TMH (2006)
2. A User Guide to Unix System", Thomas Rebecca yate, Second Edition, 2002, Tata McGraw Hill.
3. Stephen Prata "Advanced Unix -A programmer's Guide".



Sandip
9/5/19

Baitali

Sm

Rajendra

M.Sc. Fourth Semester
CS 401 – Linux/Unix Administration
Max marks: 50 Min Marks :17

Course Objectives (CoB): The course is aimed at

5. To understand and make effective use of Unix/ linux utilities and shell scripting language to solve problems
6. To implement in C some standard Unix/linux utilities like mv,cp,ls etc...
7. To Develop the skills the necessary for systems programming including file system programming, process and signal management and inter-process communication
8. To develop the basic skills required to write network programs using sockets

Expected Course Outcome (CO): At the end of the course the student should be able to:

6. Explain the structure and functions of operating systems along with their components, types and working.
7. Make use of appropriate Unix/Linux commands for memory management, file management and directory management.
8. Analyze the performance of different scheduling algorithms along with the policies for concurrency and deadlock management.
9. Elaborate the system calls for process management and file management.
10. Understand the basic set of commands and editors in Linux operating system.

CS - 401 Linux/ Unix Administration

Max. Marks : 50

Min. Marks : 17

Unit No.	Topics
Unit 1	Background: Evolution of Unix OS. Unix implementations. Features of Unix operating system. Linux operating system: Development of Linux. Applications of Linux operating system.
Unit 2	Basic UNIX environment: Basic commands, directory management, pipes, tee, I/O redirection and other utilities. Advanced commands: File system and process management commands, Shell, Pattern matching, Navigating the File Systems.
Unit 3	Unix editor: VI editor, Creating new files. Text addition, deletion and changes. Dealing with sentences and paragraphs. Searching. Cut, paste and copy. Running C/C++ programs. Shell programming: Features of shell. Shell variables. Control statements. Advance shell programming: Command line arguments. Interactive shell scripts. Debugging of shell scripts. Communication facilities in Unix.
Unit 4	Structure of unix operating system: Structure of unix kernel, Unix system calls. Unix system: File system calls, Process management calls. Advance Filter: Awk: Number processing, Interface with shell, functions.
Unit 5	Unix system administration: Adding and removing users. User accounting. Adding and removing hardware. Performing backups and restore. Disk space management. Unix system administration: Configuring the kernel. Network management in Unix. Performance analysis. Unix Desktop.

1. Text Book :

UNIX Operating Systems: Sumitabh Das, Tata McGraw Hills publication.

2. Reference books :

1. **UNIX System Administration Handbook**(Second edition): Evi Nemeth, Garth Synder, Scott Seebass, Trent R Hein, Pearson Education - Asia, 2000.

2. C: **Design of UNIX Operating System:** Maurice J. Back, Pearson Education - Asia.