



MANONMANIAM SUNDARANAR UNIVERISTY,  
TIRUNELVELI-12

## **SYLLABUS**

### **PG - COURSES – AFFILIATED COLLEGES**

Course Structure for M. C. A.

(Choice Based Credit System)

(with effect from the academic year 2023-2024 onwards )



<b>Semester-I</b>				
<b>Part</b>	<b>Subject Status</b>	<b>Subject Title</b>	<b>Subject Code</b>	<b>Credit</b>
3	Core	DISCRETE MATHEMATICS		4
3	Core	LINUX AND SHELL PROGRAMMING		4
3	Core	PYTHON PROGRAMMING		4
3	Elective	ADVANCED OPERATING SYSTEMS		3
3	Elective	ADVANCED COMPUTER NETWORKS		3
3	Practical Lab I	LINUX AND SHELL PROGRAMMING LAB		2
3	Practical Lab I	PYTHON PROGRAMMING LAB		2
	AEC-I	EFFECTIVE COMMUNICATION IN ENGLISH		1
	SEC I	BASICS OF WEB DESIGN		1



**Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks**

**A. Scheme for internal Assessment:**

Maximum marks for written test: **15 marks**

**3 internal tests**, each of **1 hour** duration shall be conducted every semester.

To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks and Seminar for 5 marks

The break up for internal assessment shall be:

Written test- 15 marks; Assignment -5 marks; Seminar-5 Marks Total - 25 marks

**B. Scheme of External Examination**

**3 hrs.** examination at the end of the semester

A – Part : 1 mark question two - from each unit

B – Part : 5 marks question one - from each unit

C – Part : 8 marks question one - from each unit

➤ **Conversion of Marks into Grade Points and Letter Grades**

S.No.	Percentage of Marks	Letter Grade	Grade Point	Performance
1	90 - 100	O+	10	Outstanding
2	80 - 89	O	9	Excellent
3	70 - 79	A+	8	Very Good
4	60 - 69	A	7	Good
5	55 - 59	B+	6	Above Average
6	50 - 54	B	5	Pass
7	0 - 49	RA	-	ReAppear
8	Absent	AA	-	Absent

➤ **Cumulative Grade Point Average (CGPA)**

$$\text{CGPA} = \frac{\Sigma (\text{GP} \times \text{C})}{\Sigma \text{C}}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

➤ **Classification**

- First Class with Distinction : CGPA  $\geq 7.5^*$
- First Class : CGPA  $\geq 6.0$
- Second Class : CGPA  $\geq 5.0$  and  $< 6.0$
- Third Class : CGPA  $< 5.0$



## Discrete Mathematics

### Course Objective

- To know the concepts of relations and functions
- To distinguish among different normal forms and quantifiers
- To solve recurrence relations and permutations & combinations
- To know and solve matrices , rank of matrix & characteristic equations
- To study the graphs and its types

### Unit-I

Relations- Binary relations-Operations on relations- properties of binary relations in a set – Equivalence relations— Representation of a relation by a matrix - Representation of a relation by a digraph – Functions-Definition and examples- Classification of functions-Composition of functions-Inverse function

### Unit-II

Mathematical Logic-Logical connectives-Well formed formulas – Truth table of well formed formula –Algebra of proposition –Quine's method- Normal forms of well formed formulas- Disjunctive normal form-Principal Disjunctive normal form-Conjunctive normal form-Principal conjunctive normal form-Rules of Inference for propositional calculus – Quantifiers- Universal Quantifiers- Existential Quantifiers

### Unit-III

Recurrence Relations- Formulation -solving recurrence Relation by Iteration solving Recurrence Relations- Solving Linear Homogeneous Recurrence Relations of Order Two- Solving Linear Non homogeneous Recurrence Relations. Permutations- Cyclic permutation- Permutations with repetitions- permutations of sets with indistinguishable objects- Combinations- Combinations with repetition

### Unit-IV

Matrices- special types of matrices-Determinants-Inverse of a square matrix-Cramer's rule for solving linear equations-Elementary operations-Rank of a matrix solving a system of linear equations-characteristic roots and characteristic vectors-Cayley-Hamilton Theorem-problems

### Unit-V

Graphs -Connected Graphs -Euler Graphs- Euler line-Hamiltonian circuits and paths – planar graphs – Complete graph-Bipartite graph-Hyper cube graph-Matrix representation of graphs

### Text book

1. N.Chandrasekaran and M.Umaparvathi, Discrete mathematics, PHI Learning Private Limited, New Delhi, 2010.

### Reference Book

1. Kimmo Eriksson & Hillevi Gavel, Discrete Mathematics & Discrete Models, Student litteratur AB, 2015.
2. Kenneth H. Rosen Discrete Mathematics and applications, Mc Graw Hill, 2012.



# Linux and Shell Programming

## Course Objective

- To teach principles of operating system including File handling utilities, Basic Linux commands, Scripts and filters.
- To familiarize fundamentals of shell (bash), shell programming, pipes, Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
- To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API's).
- To facilitate students in understanding Inter process communication, semaphore and shared memory.
- To explore real-time problem solution skills in Shell programming.

## Unit-I

**Basic bash Shell Commands:** Interacting with the shell-Traversing the file system-Listing files and directories-Managing files and directories-Viewing file contents.

**Basic Script Building:** Using multiple commands-Creating a script file-Displaying messages-Using variables-Redirecting input and output-Pipes-Performing math-Exiting the script. **Using Structured Commands:** Working with the if-then statement-Nesting ifs-Understanding the test command-Testing compound conditions-Using double brackets and parentheses-Looking at case.

(Book-1, Chapters: 3, 11, and 12)

## Unit-II

**More Structured Commands:** Looping with for statement-Iterating with the until statement-Using the while statement-Combining loops-Redirecting loop output.

**Handling User Input:** Passing parameters-Tracking parameters-Being shifty-Working with options-Standardizing options-Getting user input. **Script Control:** Handling signals-Running scripts in the background-Forbidding hang-ups – Controlling a Job-Modifying script priority-Automating script execution.

(Book-1, Chapters: 13, 14, and 16)

## Unit-III

**Creating Functions:** Basic script functions-Returning a value-Using variables in functions-Array and variable functions-Function recursion-Creating a library-Using functions on the command line. **Writing Scripts for Graphical Desktops:** Creating text menus-Building text window widgets-Adding X Window graphics. **Introducing sed and gawk:** Learning about the sed Editor-Getting introduced to the gawk Editor-Exploring sed Editor basics.

(Book-1, Chapters: 17, 18, and 19)

## Unit-IV

**Regular Expressions:** Defining regular expressions-Looking at the basics- Extending our patterns-Creating expressions. **Advanced sed:** Using multiline commands-Understanding the hold space-Negating a command-Changing the flow- Replacing via a pattern-Using sed in scripts-Creating sed utilities. **Advanced gawk:** Reexamining



gawk-Using variables in gawk-Using structured commands-Formatting the printing-Working with functions.  
(Book-1, Chapters: 20, 21, and 22)

## Unit-V

**Working with Alternative Shells:** Understanding the dash shell-Programming in the dash shell-Introducing the zsh shell-Writing scripts for zsh. **Writing Simple Script Utilities:** Automating backups-Managing user accounts-Watching disk space. **Producing Scripts for Database, Web, and E-Mail:** Writing database shell scripts-Using the Internet from your scripts-Emailing reports from scripts. **Using Python as a Bash Scripting Alternative:** Technical requirements-Python Language-Hello World the Python way-Pythonic arguments-Supplying arguments- Counting arguments-Significant whitespace-Reading user input-Using Python to write to files-String manipulation.

(Book-1, Chapters: 23, 24, 25, and Book-2, Chapter: 14)

## Text book:

1. Richard Blum, Christine Bresnahan, “Linux Command Line and Shell Scripting BIBLE”, Wiley Publishing, 3rd Edition, 2015.Chapters: 3, 11 to 14, 16 to 25.
2. Mokhtar Ebrahim, Andrew Mallett, “Mastering Linux Shell Scripting”, Packt Publishing, 2nd Edition, 2018. Chapter: 14.

## Reference Books:

1. CliffFlynt, SarathLakshman, ShantanuTushar, “Linux Shell Scripting Cookbook”, Packt Publishing, 3rd Edition, 2017.
2. Stephen G.Kochan, Patrick Wood, “Shell Programming in Unix, Linux, and OSX”, Addison Wesley Professional, 4th Edition, 2016.
3. Robert Love, “Linux System Programming”, O'Reilly Media, Inc, 2013
4. W.R. Stevens, “Advanced Programming in the UNIX environment”, 2<sup>nd</sup> Edition, Pearson Education, 2013
5. Graham Glass, King Ables, “ UNIX for Programmers and Users”, 3rd Edition, Pearson Education, 2003

# Python Programming

## Course Objectives:

- To acquire programming skills in core Python
- To learn Strings and function
- To develop object oriented skills in Python
- To comprehend various Python Packages
- To develop web applications using Django

## Unit I

**Introduction :** Fundamental ideas of Computer Science - Strings, Assignment, and Comments - Numeric Data types and Character sets – Expressions – Loops and Selection Statements: Definite iteration: the for Loop - **selection:** if and if-else



statements - Conditional iteration: the while Loop

## Unit II

**Strings and Text Files:** Accessing Characters and substrings in strings – Data encryption-Strings and Number systems- String methods – Text - Lists and Dictionaries: Lists – Dictionaries – Design with Functions: A Quick review – Problem Solving with top-Down Design - Design with recursive Functions - Managing a Program's namespace - Higher-Order Functions

## Unit III

**Design with Classes:** Getting inside Objects and Classes – Data-Modeling Examples – Building a New Data Structure – The Two – Dimensional Grid - Structuring Classes with Inheritance and Polymorphism - Graphical User Interfaces - The Behavior of terminal-Based programs and GUI-Based programs - Coding Simple GUI-Based programs - Windows and Window Components - Command Buttons and responding to events

## Unit IV

**Working with Python Packages:** NumPy Library-Ndarray – Basic Operations – Indexing, Slicing and Iteration – Array manipulation - Pandas –The Series – The DataFrame - The Index Objects – Data Vizualization with Matplotlib – The Matplotlib Architecture – pyplot – The Plotting Window – Adding Elements to the Chart – Line Charts – Bar Charts – Pie charts

## Unit V

**Django:** Installing Django – Building an Application – Project Creation – Designing the Data Schema - Creating an administration site for models - Working with Query Sets and Managers – Retrieving Objects – Building List and Detail Views

### Text Book:

1. K.A. Lambert, “ Fundamentals of Python: first programs”, Second Edition, Cengage Learning, 2018 (Unit - I, II and III)
2. Fabio Nelli, “Python Data Analytics: With Pandas, NumPy, and Matplotlib”, Second Edition, Kindle Edition, 2018 (Unit - IV)
3. Antonio Mele, “Django 3 By Example”, Third Edition, 2020 (Unit - V)

## Linux and Shell Programming - Lab

### Course Objectives

- To enable the students to study and understand the efficiency of Linux shell script.
- To demonstrate the File Backup process.
- To develop and implement the shell script for GUI processing.
- To develop and implement the shell script for IPC and Networking.
- To demonstrate PostgreSQL.



### List of Programs

1. Write a Shell Script program to calculate the number of days between two dates.
2. Write a Shell Script program to check systems on local network using control structures with user input.
3. Write a Shell Script program to check systems on local network using control structures with file input.
4. Write a Shell Script program to demonstrate the script control commands.
5. Write a Shell Script program to demonstrate the Shell script function.
6. Write a Shell Script program to demonstrate the Regular Expressions.
7. Write a Shell Script program to demonstrate the sed and awk Commands.
8. Write a Shell Script program to demonstrate the File Backup process through creating a daily archive location.
9. Write a Shell Script program to create a following GUI tools.
  - a) Creating text menus
  - b) Building text window widgets
10. Write a Shell Script program to demonstrate to connect a PostgreSQL database and performing CRUD operations.

## Python Programming Lab

### Course Objectives:

This course enables the students:

- To master the fundamentals of writing python scripts
- To create program using elementary data items
- To implement Python programs with conditionals and loops
- To use functions for structuring Python programs
- To develop web programming with Django

### Implement the following in Python:

1. Program using elementary data items, lists, dictionaries and tuples
2. Program using conditional branches, loops
3. Program using functions
4. Program using classes and objects
5. Program using inheritance
6. Program using polymorphism
7. Program to implement file operations
8. Program using Pandas
9. Program using Modules
10. Program for creating dynamic and interactive web pages using forms



## **EFFECTIVE COMMUNICATION IN ENGLISH**

### **Course Objectives:**

- To help the students develop communication skills and self confidence
- To motivate the students to acquire employability skills
- To introduce various interview techniques to the students
- To motivate the students to become good public speakers
- To develop leadership qualities in the students
- To guide the students how to tackle interviews
- To help the students to enhance their writing skills
- To teach the students how to write a good CV
- To introduce various articles in writing to the students

### **Public Speaking**

The power of Public Speaking, • Developing confidence, • Planning • Preparation • Successful and effective delivery of speech

### **Group Discussion**

What is group discussion? • Why are group discussions held? • Preparation for a group discussion • Skills for effective participation • Traits tested in a group discussion • Initiating a group discussion • Non-verbal communication in group discussion • Types of group discussions

### **Interviews**

Interviewing in the 21st century • Developing an Interview Strategy • Taking Care of the Details • Practicing for the Interview • During the Interview • Stress Interviews • Traditional Interviews

**Writing Skills** • Basics of writing • Writing paragraphs • Writing research articles • Report writing • Writing a CV

## **SEC 2- Basics of Web Design**

### **UNIT I**

Introduction to Web Design Introduction of Internet, WWW, Website, Working of Websites, Webpages, Front End, Back End, Client and Server Scripting Languages, Responsive Web Designing, Types of Websites (Static and Dynamic Websites).

### **UNIT II**

HTML Basics HTML: Introduction, Basic Structure of HTML, Head Section and Elements of Head Section, HTML 5 Introduction, HTML5 New Elements: Section, Nav, Article, Aside, Audio Tag, Video Tag, HTML5 Form Validations: Require Attribute. Autofocus Attribute, email, number type, date type, Range type, HTML embed multimedia, HTML Layout, HTML Iframe





### **Unit III**

CSS Introduction to CSS, Types of CSS, CSS Selectors: Universal Selector, ID selector, Tag Selector, Class Selector, Sub Selector, Attribute Selector, Group Selector, CSS Properties: Back Ground properties, Block Properties, Box properties, List properties, Border Properties, Positioning Properties, CSS Lists CSS Tables, CSS Menu Design CSS Image Gallery

### **Unit IV**

JavaScript and Angular JS Introduction to Client Side Scripting Language, Variables in Java Script, Operators in JS, Conditions Statements, JS Popup Boxes.

### **Unit V**

JS Events, Basic Form Validations in JavaScript. Introduction to Angular JS: Expressions, Modules and Directives.

### **Books for Reference:**

1. HTML5, Black Book, Kagent Learning Solution Inc, 2014
2. Mastering HTML, CSS & JavaScript Web Publishing by Lemay Laura, BPB publications

