Progressive Education Society's

Modern college of Arts, Science and Commerce,

Ganeshkhind,Pune-16

Autonomous

NEP 2020 (2)

Department of Mathematics

(Faculty of Science and Technology)

Skill Enhancement Course (SEC)
First Year

Choice Based Credit System Syllabus

To be implemented from Academic Year 2024-25

Skill Enhancement Course (SEC) – Mathematics

Semester	Paper Code	Title of the Paper	Theory / Practical	No. of Credits
1	24MAT11404	Data Representation using Graphs.	Practical	2
2	24MAT12404	Introduction to Python Programming	Practical	2

Semester – 1

Paper Code : 24MAT11404   **Total No. of Credits : 2**

Name of the Paper : Data Representation using Graphs (Practical).

Course Outcome	
CO	Student will be able to
CO1	Read and interpret displays of data.
CO2	Construct appropriate displays of data: frequency table, bar chart, line bar chart, scatter etc.
CO3	Critically analyse data displays.
CO4	Use mathematical software to display the data graphically.

Detailed Syllabus

Unit 1 : Introduction , Nature and format of Data, Discrete data , continuous data, dependent vs independent variable, how to choose suitable graph for given data

Unit 2 : Construction and interpretation of different types of graphs Bar charts, Line charts, Histograms, Pie charts, scatter diagrams etc.

Unit 3 : Application in different fields such as stock market, medical field.

Unit 4 : Graph plotting using software.

List of practical

Practical 1: Nature and format of Data and organization in form of table

Practical 2: Graph construction (manually).

Practical 3: Graph construction (manually).

Practical 4: Graph construction (manually).

Practical 5: Graph construction (manually).

Practical 6: Application.

Practical 7: Application.

Practical 8: Application.

Practical 9: Introduction to software.

Practical 10: Introduction to software.

Practical 11: Graph plotting using software.

Practical 12: Graph plotting using software.

Practical 13: Miscellaneous.

Practical 14: Miscellaneous.

Practical 15: Miscellaneous.

Semester – 2

Paper Code : 24MAT12404   **Total No. of Credits : 2**

Name of the Paper : Introduction to Python Programming (Practical).

Course Outcome	
CO1	Student will understand how Python is useful scripting language for developers.
CO2	Student will be able to use lists, tuples & dictionaries in Python programs.
CO3	Student will acquire programming skills in core Python.

Detailed Syllabus

1.Introduction to Python

a. Installation of Python
b. Values and types: int, float and str,
c. Variables: assignment statements, printing variable values, types of variables.
d. Operators, operands and precedence:+, -, /, *, **, % PEMDAS(Rules of precedence)
e. String operations: + : Concatenation, * : Repetition
f. Boolean operator:
   i. Comparison operators: ==, !=, >, =, <=
   ii. Logical operators: and, or, not
g. Mathematical functions from math, cmath modules.
h. Keyboard input: input() statement

2.String, list, tuple

i. Strings:
   i. Length (Len function)
   ii. String traversal: Using while statement, Using for statement
   iii. String slice
   iv. Comparison operators (>, <, ==)
j. Lists:
   i. List operations
   ii. Use of range function
   iii. Accessing list elements
   iv. List membership and for loop
   v. List operations
   vi. Updating list: addition, removal or updating of elements of a list
k. Tuples:
   i. Defining a tuple,
   ii. Index operator,
   iii. Slice operator,
   iv. Tuple assignment,
   v. Tuple as a return value

3.Iterations and Conditional statements

    l. Conditional and alternative statements, Chained and Nested Conditionals: if, if-else, if-elif-else, nested if, nested if-else

    m. Looping statements such as while, for etc, Tables using while.

    n. Functions:

       i. Calling functions: type, id

      ii. Type conversion: int, float, str

      iii. Composition of functions

      iv. User defined functions, Parameters and arguments

4.Linear Algebra

    o. Matrix construct, eye(n), zeros(n,m) matrices

    p. Addition, Subtraction, Multiplication of matrices, powers and invers of a m matrix.

    q. Accessing Rows and Columns, Deleting and Inserting Rows and Columns

    r. Determinant, reduced row echelon form, nullspace, columnspace, rank

    s. Eigenvalues, Eigenvectors, and Diagonalization

List of practical

Practical 1: Introduction to Python (Unit 1 : 1.1 , 1.2 , 1.3).

Practical 2: Practical based on Unit 1 : 1.4 , 1.5.

Practical 3: Practical based on Unit 1 : 1.6 .

Practical 4: Mathematical functions , input function(Unit 1 : 1.7 , 1.8).

Practical 5: Strings (Unit 2 : 2.1).

Practical 6: Lists and Tuples(Unit 2 : 2.2 , 2.3).

Practical 7: Iterations and conditional statement – I (Unit 3 : 3.1).

Practical 8: Iterations and conditional statement – II (Unit 3 : 3.2).

Practical 9: Iterations and conditional statement – III (Unit 3 : 3.2).

Practical 10: Matrices – I (Unit 4 : 4.1).

Practical 11: Matrices – II (Unit 4 : 4.2).

Practical 12: Matrices – III (Unit 4 : 4.3).

Practical 13: Matrices – IV (Unit 4 : 4.4).

Practical 14: Graphs of functions – I

Practical 15: Graphs of functions – I

Modalities for conducting practicals and practical Examination:

1) There will be 4 hour practical session per 15 students batch per week.
2) A question bank consisting of 50 problems in all for each semester, will be the course work for this paper. Question bank will be prepared by the individual subject teacher and the problems included should be changed every year.
3) Each student will maintain a journal to be provided by the college.
4) The internal 10 marks will be given on the basis of journal prepared by student and the cumulative performance of student at practicals.
5) Practical examination will consist of written examination of 30 marks which will be converted to marks out of 15.
6) Written examination will be of 25 marks and oral examination 5 marks.
7) The pattern for the practical written examination will be as follows:

   - **Solve any 5 questions out of 8 questions.**
   - **Each question will be of 5 marks.**

8) Study tours may be arranged at places having important mathematical institutes orhistorical places.
9) **Special Instruction**:
   a) Before starting each practical necessary introduction, basic definitions and prerequisites must be discussed.
   b) Examiners should set separate question papers, solutions and

   scheme of   marking for each batch and claim the remuneration

   as per rule.