Department of Mathematics
Revised Syllabus of II Year Diploma Program (UG)
Title of Program: Mathematical Modeling and Programming

Syllabus Structure (UG)

Year	Semester	Course No.	Course Code	Contact Hours	Credits (1Credit=15 H)	Total Marks
2	III	CT III	DMT 303	30	2	75
		CL III	DM L303	60	2	75
	IV	CT IV	DMT 404	30	2	75
		CL IV	DML404	60	2	75
	Annual	CP II	DMP202	30	1	50
	Industrial and or Incubation and or Research and or Field Training			30	1	-
			Total	**240**	**10**	**350**

D: Diploma, C: Course, T: Theory, L: Lab (Practical), P: Project
Total No. of Courses: 6 (Theory: 02, Practical: 02, Project: 01)
Theory and Practical: Semester, Project: Annual

Semester III

CT-III: DMT 303: Title: Mathematical Modeling and Programming
(Contact Hrs: 30 Credits: 2)

Learning Objectives:

Students will be able to

1) understand programming knowledge of Scilab software.

2. perform Mathematical operations.

Unit I: (15)

1.1 Overview

    1.1.1 Introduction

    1.1.2 Overview of Scilab

    1.1.3 How to get and install Scilab

1.1.4 How to get help

1.2 Getting started

1.2.1 The console

1.2.2 The editor

1.3 Basic elements of the language

1.3.1 Creating real variable

1.3.2 Variable names

1.3.3 Elementary mathematical functions

1.3.4 Pre-defined mathematical variables

1.3.5 Complex numbers

1.3.6 Strings

Unit II: Matrices (15)

2.1 Overview

2.2 Create a matrix of real values

2.3 The empty matrix []

2.4 Accessing the elements of a matrix

2.5 The colon ":" operator

2.6 The eye matrix

2.7 The dollar "$" operator

2.8 Elementwise operations

2.9 Conjugate transpose

2.10 Multiplication of two vectors

2.11 Comparing two real matrices

Learning Outcomes:

After completion of the unit, Student is able to

1. perform Matrix operations in Scilab.

2. perform Mathematical operations in Scilab.

Reference Books:

1. Introduction to Scilab, Consortium Scilab

2. Modeling and simulation in Scilab, Springer, Stephen L. Campbell

   Jean-Philippe Chancelier and Ranine Nikoukhah

3. Scilab Bag of Tricks, Lydia E. van Dijk, Christoph L. Spiel

4. SCILAB, Er. Hema Ramchandran and Dr. Achutsankar Nair, S. Chand Publishers,
   ISBN-10: 8121939704, 2011.

CL-III: DM L303: **Title: Mathematical Modeling and programming**
<div align="center">(Contact Hrs: 60 Credits: 02)</div>

Learning Objectives:

Students will be able to

1. install Scilab software

2. understand the basics of SCILAB Software and its data class.

3. perform elementary matrix operations.

4. perform numerical computation.

<div align="center">**List of Practical's (15)**</div>

1. Scilab introduction and installation.

2. Basics of Scilab, Creating real variables.

3. Elementary mathematical operations.

4. Theory of integers.

5. Creating matrix in Scilab.

6. Constuction of various types of Matrices in Scilab.

7. Colon ':' and dollar '$'operator.

8. Theory of eye matrices

9. Low level operations.

10. Elementwise operations.

11. Conjugate transpose and non-conjugate transpose.

12. Multipication of two vectors

13. Lower level linear algebra.

14. Higher level linear algebra.

15. Array and Matrices

Learning Outcomes:

After completion of the unit, Student is able to

1. perform Matrix operations in Scilab.

2. perform Mathematical operations in Scilab.

Reference Books:

1. Introduction to Scilab, Consortium Scilab

2. Modeling and simulation in Scilab, Springer, Stephen L. Campbell
   Jean-Philippe Chancelier and Ranine Nikoukhah

3. Scilab Bag of Tricks, Lydia E. van Dijk, Christoph L. Spiel

4. SCILAB, Er. Hema Ramchandran and Dr. Achutsankar Nair, S. Chand Publishers,
    ISBN-10: 8121939704, 2011.

Semester IV

**CT-IV: D MT 404: Title: Mathematical Modeling and Programming
(Contact Hrs: 30 Credits: 2)**

Learning Objectives:

Students will be able to

1. understand programming knowledge of Scilab Software.
2. learn representation of different curves in Scilab.

Unit I: Looping and branching   (15)

1.1 The if statement

1.2 The select statement

1.3 The for statement

1.4 The while statement

1.5 The break and continue statements

Unit II: Functions and Plotting (15)

2.1 Functions

      2.1.1 Defining a function

      2.1.2 Function libraries

      2.1.3 The return statement

2.2 Plotting

      2.2.1 Overview

      2.2.2 2D plot

      2.2.3 3D plot

Learning Outcomes:

After completion of the unit, Student is able to

1. interpret and visualize simple mathematical functions and operations thereon using plots.

2. understand the main features of the SCILAB program development environment to enable their usage in the higher learning

Reference Books:

1. Introduction to Scilab, Consortium Scilab

2. Modeling and simulation in Scilab, Springer, Stephen L. Campbell Jean-Philippe Chancelier and Ranine Nikoukhah

3. Scilab Bag of Tricks, Lydia E. van Dijk, Christoph L. Spiel

4. SCILAB, Er. Hema Ramchandran and Dr. Achutsankar Nair, S. Chand Publishers, ISBN-10: 8121939704, 2011.

CL-IV: DML404: **Title (Practical):**

(Contact Hrs: 60 Credits: 02)

Learning Objectives:

Students will be able to

1. Understand the need for simulation for the verification of mathematical functions.

2. Understand the main features of the SCILAB program development environment to enable their usage in the higher learning.

3. Implement simple mathematical functions in numerical computing environment.

4. Analyze the program for correctness and determine the output and verify it under simulation environment using SCILAB tools.

List of Practical's (15)

1. Manipulating strings in SCILAB

2. Creation and applications of functions.

3. Programming in Scilab using if statement.

4. Programming in Scilab using if else statement

5. Programming in Scilab using select statement.

6. Programming in Scilab using for statement.

7. Programming in Scilab using while statement.

8. Programming in Scilab using break and continuos statement.

9. Defining and using functions in Scilab.

10. Creating graphs of simple functions.

11. 2D plots

12. 3D plots

13. Surface plotting

14. Cantour plots

15. Titles, axes and legends.

Learning Outcomes:

After completion of the unit, Student is able to

1. develop programs in SCILAB.
2. evaluate, analyze and plot results.

Reference Books:

1. Introduction to Scilab, Consortium Scilab

2. Modeling and simulation in Scilab, Springer, Stephen L. Campbell

   Jean-Philippe Chancelier and Ranine Nikoukhah

3. Scilab Bag of Tricks, Lydia E. van Dijk, Christoph L. Spiel

4. SCILAB, Er. Hema Ramchandran and Dr. Achutsankar Nair, S. Chand Publishers,
   ISBN-10: 8121939704, 2011.

CP-II: D MP202: Project
(Contact Hrs. 60, Credits: 2)

Industrial and or Incubation and or Research and or Field Training
(Contact Hrs. 60, Credits: 2)

BOS Sub-Committee   Expert Committee
1. Chairman: Miss. B. R. Tambe   1. Dr. N. D. Sangale
2. Member: Miss. G. N. More   2. Miss. P. R. Demanna