Department of Mathematics

Revised Syllabus of II Year Advanced Diploma Program (PG)

Title of Program: **Advanced Scilab**

Syllabus Structure: **For PG**

Year	Semester	Paper No.	Paper Code	Contact Hours	Credits (1Credit =15H)	Total Marks
2	III	CT III	ADMT 303	30	2	75
		CL III	ADML 303	60	2	150
	IV	CT IV	ADMT 404	30	2	75
		CL IV	ADMT 404	60	2	150
	Annual	CP II	ADMP 202	60	2	150
		Industrial/Incubation/Research /Field Training		30	2	-
			Total	**270**	**12**	**600**
			Total	**510**	**22**	**1200**

AD: Advance Diploma

C: Course, T: Theory, L: Lab (Practical), P: Project

Total No. of Papers: 06 (Theory: 02, Practical: 02, Project: 01)

Theory and Practical: Semester**, Project: Annual**,

Semester III

CT-III: ADMT 303: Title: Scilab Programming and Plotting.
(Contact Hrs: 30 Credits: 2)

Learning Objectives:

1. To give Programming knowledge of Scilab software.

2. To learn representation of different curves in Scilab.

Unit I: Programming in Scilab (15)

    Introduction
    Input and Output Statements
    Assignment statements
    Interactive input
    Output functions
    Control Structures
    Looping
        for loop
        While loop
        Break and continue statements

Branching control structures
    if-else statements
File Handling
File opening and closing functions
Formatted input/output functions
Importing data from Excel files
Reading/writing CSV files
Function Programs

Unit II: Scilab Graphics (15)

Introduction
Two Dimensional Plots
Plotting multiple curves
Adding legends
Interactively editing a figure
Editing a plot through the console window
Creating Commonly Used 2D Plots
        Logarithmic plots
        Polar plots
        Area plots
        Bar charts
        Histogram plots
        Pie charts
        Stair-step plots
        2D contour plots
Three-Dimensional Plots
        3D plots
        3D parametric curves
        3D mesh and surf plots
        3D contour Plots
        3D scatter Plots

Learning Outcomes:
After successful completion of the units, student is able to
1. use different functions in Scilab.
2. plot different curves in Scilab.
Reference Books:

1. Numerical and statistical methods with SCILAB for science and engineering, vol. 1, gilberto e. urroz
2. Introduction to Scilab, Consortium Scilab
3. Modeling and simulation in Scilab, Springer, Stephen L. Campbell Jean-Philippe Chancelier and RanineNikoukhah

CL-III: ADML303: Title: **Advanced Scilab-I**
(Contact Hrs: 60 Credits: 02)

Learning Objectives:

Students should

1. use various methods to either create or import graphics into Scilab document.
2. perform mathematical operations to analyse data.

List of Practical's (15)

1) Programs by using for loop
2) Programs by using while loop
3) Programs by using if statement
4) Tracing curves
5) Colouring curves
6) 2D curves plotting
7) 3D curves plotting
8) 2D curves formatting
9) 3D curves formatting
10) Exporting curves
12) Surface plotting
13) Mean, Mode, Median
14) A.M., H. M., G. M.
15) Solution of BVP

Reference Books:

1. Numerical and statistical methods with SCILAB for science and engineering, vol. 1, gilberto e. urroz
2. Introduction to Scilab, Consortium Scilab
3. Modeling and simulation in Scilab, Springer, Stephen L. Campbell Jean-Philippe Chancelier and RanineNikoukhah

Learning Outcomes: Students will be able to

1. write program using for loop and While loop.

2. tracing the curve and use styles.

3. plot, format and export the curve .

4. solve system of linear equations using Scilab

Semester IV

CT-IV: ADMT 404:

Title: **Advanced Scilab-II**

(Contact Hrs: 30 Credits: 2)

Learning Objectives:

Students Should

1. find solution of ordinary differential equations with geometrical interpretation.

2. insert polynomials and operate with polynomial in scilab.

Unit I: (15)

Introduction to ODE in Scilab
Boundary value problems
Evaluation of ODE in Scilab
Solution to Simple ODE explicit in terms of independent variable
Solution by Euler method
A simple ODE of type $dy/dt = f(t, y)$
Solution to Linear first order linear system of ODEs
Solution to the system of Linear ODEs with help of Laplace Transform
1.3.6. Solution to a Second Order ODE with constant coefficients
1.3.7 Solution to Higher order non-homogeneous ODEs with constant coefficients

Unit II: Polynomials (15)

Introduction
Polynomial functions in Scilab
Polynomial Evaluation
Roots of a Polynomial
Polynomial Arithmetic Operations
Polynomial Differentiation and Integration
Polynomial Curve Fitting

Learning Outcomes:
After completion of the unit, Student is able to
1. write differential equation in Scilab and find solution.

2. write polynomial in Scilab and find root also solve system of equation.

Reference Books:

1. Introduction to Scilab, Consortium Scilab
2. Modeling and simulation in Scilab, Springer, Stephen L. Campbell
   Jean-Philippe Chancelier and RanineNikoukhah
3. Scilab Bag of Tricks, Lydia E.vanDijk, Christoph L. Spiel

ADML202: (Practical): PL II
(Contact Hrs: 120 Credits: 05)

Learning Objectives:

Student should:

1. learn to insert differential equations in Scilab.

2. learn to find degree, order of differential equation.

3. solve system of equations.

4. understand geometric interpretation of solution.

List of Practical's (30)

1) Solution of Difference equations
2) Solution of Algebraic equations
3) Application of Non linear Differential equations
4) Functions related to polynomials
5) Order and degree of polynomials
6) Roots of higher degree polynomials
7) lcm of two or more degree polynomials
8) gcd of two or more degree polynomials
9) Convergence rate of higher order polynomials
10) Bisection Method
11) Secant method
12) Regula falsi method
13) Newton's raphson method
14) Algebra of polynomial
15) Solution of system of equation

Learning Outcomes:

Students will be able to

1. insert the polynomials and perform operations in Scilab.

2. identify roots of polynomial.

3. find lcm and gcd of two or more degree polynomials.

4. solve system of linear equations using Scilab

Reference Books:

1. Introduction to Scilab, Consortium Scilab
2. Modeling and simulation in Scilab, Springer, Stephen L. Campbell
   Jean-Philippe Chancelier and RanineNikoukhah
3. Scilab Bag of Tricks, Lydia E.vanDijk, Christoph L. Spiel

CP-II: ADMP202: 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. Name of Academic Expert-Dr.N.D.Sangle
    2.   Member-Mr.T.A.Shelar   2. Name of Industrial Expert-Miss.P.R.Demanna