INTEGRAL TRANSFORMS AND APPLICATIONS (IC)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
18CSM31	3:0:2	4	CIE:50 SEE:50	3 Hours	BS

Course Objectives:

This course will enable the students to:

- Understand the basic calculations, array operations, for and while loops, plotting graphs using SCILAB commands
- Understand the Laplace transforms and inverse Laplace transforms of standard functions , periodic function and unit step functions
- Understand the inverse Laplace transforms of some standard functions and product of two functions
- Learn the Z- Transforms, Fourier Transforms and inverse Fourier Transforms

Syllabus

Module – I

SCI LAB:

Introduction to SCILAB, and its family, Menus and toolbars, Types of windows and types of files, SCILAB Help system, Basic calculations in SCILAB, Basic variables, Functions-Elementary Mathematical, Built-in and User defined functions. Array operations, Matrix operations, Loops: for and while loops, condition statements- if then and if-then-else statements, plotting of graphs.**07 Hours**

Module – II

Fourier Transform:

FourierTransform-Fourier Sine and CosineTransform, Finite Fourier Sine and CosineTransform, properties of Fourier transform, Convolution theorem and theirinverse transforms. **08 Hours**

Module – III

Laplace transform:

Definition, Transforms of elementary functions, properties of Laplace transforms, transforms of periodic function, unit step function and unit impulse function.**08Hours**

Module – IV

Inverse Laplace transforms and applications:

Inverse Laplace transforms for standard functions, convolution theorem and problems, applications, solution of linear differential equation with initial condition. **08 Hours**

Module – V

Z- Transforms:

Definition, Some standard Z-transforms, Linearity property, Damping rule, some standard results ,Shiftingrule, Initial value and final value theorems-problems, Inverse Z-transform. Applications of Z-transforms to solve difference equations. **08 Hours**

Course Outcomes:

On completion of this course the students are able to

- Understand the SCILAB commands to solve the various types Engineering problems
- Compute the Fourier and inverse Fourier Transforms.
- Apply the Acquired knowledge to find Laplace transforms of some functions
- Solve the linear differential equation with initial conditions using inverse Laplace Transform
- Determine the solution of Difference Equations Using Z-Transforms

Text Books:

1. Dr. B.S. Grewal:"Higher Engineering Mathematics", (Chapters21 ,22, 23), Khanna Publishers, New Delhi, 42nd Edition, 2012, ISBN:9788174 091956.
2. N.P. Bali and Dr. Manish Goyal: "A Text Book of Engineering Mathematics", (Chapters 18, 20, 23), Laxmi Publications (P) Ltd., New Delhi, 9thEdition, 2014, ISBN: 9788131808320.
3. SCILAB Group: "Introduction to SCILAB, A Users Guide" .

Reference Books:

1. Erwin Kreyszig: "Advanced Engineering Mathematics", (Chapters 6,11), Wiley Pvt. Ltd. India, New Delhi, 9th Edition, 2011, ISBN 13: 9788126531356.
2. B.V. Ramana: "Higher Engineering Mathematics", (Chapters 12,20,21), Tata McGraw – Hill Publishing company Limited, New Delhi, 2nd Reprint, 2010, ISBN 13: 978-0-07063419-0.

E-Resources:

http://bookboon.com/en/essential-engineering-mathematics-ebook
https://www.free-ebooks.net/ebook/essential-engineering-mathematics
https://www.scilab.org/resources/documentation/books
https://archive.org/details/AdvancedEngineeringMathematics10thEdition
https://mars.uta.edu/mae3183/simulation/introscilab_baudin.pdf

LIST OF SCILAB EXPERIMENTS

Sl.no	Name of Experiment
01	SCILAB Environment
02	Basic operationsin SCILAB
03	Basic Matrix operations
04	SCILAB programming environment
05	Use of Functions
06	Plottingof 2D and 3D Curves
07	Polynomial Evaluationand Determinationof Roots of a Polynomial
08	Statistics Using SCILAB
09	Differentiationand Integration using SCILAB
10	Numerical Methods using SCILAB