VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

JNANASAGARA CAMPUS, BALLARI-583105

Department of Studies in

Mathematics

IV Semester Syllabus

Bachelor of Science/Commerce /Arts/etc…

With effect from 2021-22 and onwards

Approved in BOS dated on 23-09-2022

IV Semester

DSC4: Integral Transform & Partial Differential Equations

Course Title: Integral Transform & Partial Differential Equations	Course code: 21BSC4C4MTL
Total Contact Hours: 56	Course Credits: 04
Internal Assessment Marks: 40	Duration of SEE: 2 hours
Semester End Examination Marks: 60	

Course Outcomes (CO's):

At the end of the course, students will be able to:

1. Solve system of first order simultaneous differential equations.
2. Find Laplace transform of some basic functions.
3. Apply Convolution theorem for solving problems.
4. Solve second order linear partial differential equations in two variables with constant Coefficients by finding complimentary function and particular integral

DSC4: Integral Transform & Partial Differential Equations

Unit	Description	Hours
1	**Laplace transforms:** Definition and basic properties. Laplace transforms of some common functions, Laplace transforms of the derivatives and the integral of the function, convolution theorem. **Inverse Laplace transforms**: Application to ordinary linear differential equation of first and second order with constant co-efficient, solving the system of first order simultaneous differential equations.	11
2	**Fourier Series**: Periodic function, Fourier series of function with period 2π and period 2L. Half range cosine and sine series, Complex form of Fourier series.	11
3	**Fourier transforms:** Definition and basic properties. Fourier integrals, Fourier sine and cosine integral, Fourier sine and cosine transforms. Properties of F-Transforms. Convolution theorem for F-Transforms, Parseval's Identity for Fourier Transforms. Relation between Laplace and Fourier Transforms. Fourier transforms of the derivatives of function	11

4	**Z -Transforms**: Definition and basic properties. Some standard Z- transforms. Linearity property, Damping Rule, Some Standard Results. Shifting Un to the right to the left, Multiplication by n. Two basic theorems (Initial Value and Final Value Theorems). Some useful Z-Transforms and Inverse Z Transforms. Evaluation of inverse Z-Transforms (Power series method). Application to Differential equations.	11
5	**Partial Differential Equations (PDEs):** Formation of Partial Differential Equations, Lagrange's linear equations Pp+Qq=R, Standard types of first order linear Partial Differential Equations and equations reducible to standard form, Charpit's method. Cauchy problem for first order PDEs. Standard type of Non-linear PDE of first kind. Solution of second order linear partial differential equations in two variables with constant Coefficients by finding complimentary function and particular integral	12

References:

1. Laplace transforms by S K Anand (Sarup and Sons New Delhi)
2. Fourier Transforms by Ian.sneddon (Dover Publications)
3. Dr.B.S.Grewal: Higher Engineering Mathematics, Khanna Publishers.
4. M.D Raisinghania: Advanced Differential Equations (S.Chand & Co).
5. B.S Grewal: Higher Engineering Mathematics (Khanna Publishers).
6. Murry. R. Spiegel: Laplace transforms (schaum's Outline Series)

Date Course Coordinator Subject Committee Chairperson

DSC4 Lab: Practical on Integral Transform & Partial Differential Equations

Course Title: Practical on Integral Transform & Partial Differential Equations	Course code: 21BSC4C4MTP
Total Contact Hours: 56	Course Credits: 04
Internal Assessment Marks: 25	Duration of SEE: 3 hours
Semester End Examination Marks: 25	

Course Outcomes (CO's):

At the end of the course, students will be able to:

1. Learn Free and Open Source software (FOSS) tools or computer programming.
2. Solve problems on Partial Differential Equations and Integral Forms
3. Find Laplace transform of various functions
4. Find the Fourier Transform of periodic functions
5. Solve differential equations by using Integral transforms.

DSC4 Lab: Practical on Integral Transform & Partial Differential Equations

Unit	Description	Hours
1	**Programs using Scilab/Maxima/Python:** Elements of Partial differential equations and Integral transforms using FOSS 1 Solutions of Linear Partial differential equations of type1 to type4 and Lagrange's method 2 Solutions of partial differential equation using Charpit's method. 3 Solutions of Second order homogenous partial differential equation with constant coefficients. 4 Solutions to the partial differential equations using separation of variables method (Heat/ Wave/Laplace). 5 Finding the Laplace transforms of some standard and periodic functions. 6 Finding the inverse Laplace transform of simple functions 7 Verification of Convolution Theorem. 8 To solve ordinary linear differential equation using Laplace transform. 9 To solve Integral equation using Laplace transform. 10 To find full range Fourier series of some simple functions with period 2π and 2L 11 To find Half range sine and cosine series of some simple functions and ploting them. 12 To find Cosine Fourier transforms.	56

	13 To find Sine Fourier transforms.	

References:

1. Fourier Transforms by Ian.sneddon (Dover Publications)
2. Dr.B.S.Grewal: Higher Engineering Mathematics, Khanna Publishers.
3. M.D Raisinghania: Advanced Differential Equations (S.Chand & Co).
4. B.S Grewal: Higher Engineering Mathematics (Khanna Publishers).

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