JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

II Year – I Semester		L	T	P	C
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MATHEMATICS-III					

CourseObjectives:

- Tofamiliarizethetechniques inpartialdifferential equations
- Tofurnishthelearnerswithbasicconceptsandtechniquesat plustwoleveltoleadthemintoadvanced level byhandling various realworldapplications.

CourseOutcomes: Attheend of the course, the student will be able to

- Interpret the physical meaning of different operators such as gradient, curland divergence (L5)
- Estimate the work done against a field, circulation and fluxusing vector calculus (L5)
- Apply the Laplace transform for solving differential equations (L3)
- Find or compute the Fourier series of periodic signals (L3)
- Knowandbeable to apply integral expressions for the forwards and inverse Fourier transform to arrange of non-periodic wave forms (L3)
- Identify solution methods for partial differential equations that model physical processes (L3)

Unit–I: Vector calculus: **(10hrs)**

Vector Differentiation: Gradient –Directional derivative–Divergence–Curl–Scalar Potential. Vector Integration: Line integral–Workdone–Area–Surfaceandvolumeintegrals–Vector integral theorems: Greens, Stokes and Gauss Divergencetheorems (without proof).

Unit–II: Laplace Transforms: **(10hrs)**

Laplace transforms of standard functions – Shifting theorems – Transforms of derivatives and integrals – Unit step function – Dirac's delta function – Inverse Laplace transforms– Convolution theorem (with out proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

Unit–III: Fourier series and Fourier Transforms: **(10hrs)**

Fourier Series: Introduction – Periodic functions – Fourier series of periodic function –Dirichlet's conditions – Even and odd functions – Change of interval – Half-range sineandcosine series.

FourierTransforms: Fourier integral theorem (without proof) –Fourier sine and cosine integrals –Sine and cosine transforms –Properties–inversetrans forms –Finite Fourier transforms.

Unit–IV: PDE of first order: **(8hrs)**

Formation of partial differential equations byelimination of arbitrary constants and arbitrary functions – Solutions of first order linear (Lag range) equation and nonlinear (standardtypes) equations.

UNITV:SecondorderPDEand Applications: **(10hrs)**

Second order PDE: Solutions of line arpartial differential equations with constantco efficient –RHS term of the typee^{axby}, sin(ax □by), cos(ax □by), x^m y^n.

Applications of PDE: Method of separation of Variables–Solution of One dimensional Wave, Heat and two-dimensional Laplace equation.

TextBooks:

1. B.S.Grewal, **Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.**
2. **B.V.Ramana,** Higher Engineering Mathematics, 2007 Edition, Tata Mc.Graw Hill Education.

ReferenceBooks:

1. **ErwinKreyszig,** Advanced Engineering Mathematics, 10thEdition, Wiley-India.
2. **Dean. G. Duffy,** Advanced Engineering Mathematics with MATLAB, 3rdEdition, CRC Press.
3. **Peter O'Neil,** Advanced Engineering Mathematics, Cengage.
4. **Srimantha Pal, SCBhunia,** Engineering Mathematics, Oxford University Press.