VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM

SYLLABUS FOR 2015 -2019

ENGINEERING   MATHEMATICS-III
(Common to all Branches)

Course Title: Engineering Mathematics - III   **Course Code : 15MAT31**
Credits: 04   **L-T-P : 4-0-0**
Contact Hours/Week : 04   **Total Hours: 50**
Exam. Marks : 80   **IA Marks : 20**

Course Objectives:

　　　The objectives of this course is to introduce students to the mostly used analytical and numerical methods in the different engineering fields by making them to learn Fourier series, Fourier transforms and Z-transforms, statistical methods, numerical methods to solve algebraic and transcendental equations, vector integration and calculus of variations.

MODULE	RBT Levels	No. of Hrs
MODULE-I **Fourier Series**: Periodic functions, Dirichlet's condition, Fourier Series of periodic functions with period 2π and with arbitrary period $2c$. Fourier series of even and odd functions. Half range Fourier Series, practical harmonic analysis-Illustrative examples from engineering field.	L1, L2 & L4	10
MODULE-II **Fourier Transforms:** Infinite Fourier transforms, Fourier sine and cosine transforms. Inverse Fourier transform. **Z-transform:** Difference equations, basic definition, z-transform-definition, Standard z-transforms, Damping rule, Shifting rule, Initial value and final value theorems (without proof) and problems, Inverse z-transform. Applications of z-transforms to solve difference equations.	L2, L3 & L4	10
MODULE- III **Statistical Methods:** Review of measures of central tendency and dispersion. Correlation-Karl Pearson's coefficient of correlation-problems. Regression analysis- lines of regression (without proof) –problems **Curve Fitting:** Curve fitting by the method of least squares- fitting of the curves of the form, $y = ax + b, y = ax^2 + bx + c$ and $y = ae^{bx}$. **Numerical Methods:** Numerical solution of algebraic and transcendental equations by Regula- Falsi Method and Newton-Raphson method.	L3	10
MODULE IV **Finite differences**: Forward and backward differences, Newton's forward and backward interpolation formulae. Divided differences- Newton's divided difference formula. Lagrange's interpolation formula and inverse interpolation formula (all formulae without proof)-Problems. **Numerical integration:** : Simpson's $(1/3)^{th}$ and $(3/8)^{th}$ rules, Weddle's rule (without proof) –Problems.	L3	10
MODULE-V **Vector integration:** Line integrals-definition and problems, surface and volume integrals- definition, Green's theorem in a plane, Stokes and Gauss-divergence theorem(without proof) and problems. **Calculus of Variations:** Variation of function and Functional, variational problems. Euler's equation, Geodesics, hanging chain, problems.	L3 & L4 L2 & L4	10

Course Outcomes: On completion of this course, students are able to:

1. Know the use of periodic signals and Fourier series to analyze circuits and system communications.

2. Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.

3. Employ appropriate numerical methods to solve algebraic and transcendental equations.

4. Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.

5. Determine the extremals of functionals and solve the simple problems of the calculus of variations.

Question paper pattern:
- The question paper will have **ten** full questions carrying equal marks.

- Each full question consisting of **16** marks.

- There will be **two** full questions (with a **maximum** of **four** sub questions) from each module.

- Each full question will have sub question covering all the topics under a module.

- The students will have to answer **five** full questions, selecting **one** full question from each module.

Text Books:

1. *B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, New Delhi, 43rd Ed., 2015.*
2. *E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2015.*

Reference books:
1. *N.P.Bali and Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers, 7th Ed., 2010.*
2. *B.V.Ramana: "Higher Engineering Mathematics" Tata McGraw-Hill, 2006.*
3. *H. K. Dass and Er. RajnishVerma: "Higher Engineerig Mathematics", S. Chand Publishing, 1st edition, 2011.*

Web links and Video Lectures:
1. *http://nptel.ac.in/courses.php?disciplineID=111*
2. *http://wwww.khanacademy.org/*
3. *http://www.class-central.com/subject/math*