VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM

SYLLABUS FOR 2015 -2019

ADDITIONAL MATHEMATICS - I

(Mandatory Learning Course: Common to All Branches)
(A Bridge course for Lateral Entry students of III Sem. B. E.)

Course Title: Additional Mathematics-I **Course Code:15MATDIP31**
Contact Hours/Week : 03 **L-T-P : 3-0-0**
Total Hours: 40 **Exam. Hours : 03**
Exam. Marks : 80 **Credits: 00**

Course Objectives:

The mandatory learning course **P13MADIP31** viz., **Additional Mathematics-I** aims to provide basic concepts of complex trigonometry, vector algebra, differential & integral calculus, vector differentiation and methods of solving first order differential equations.

MODULE	RBT Levels	No. of Hrs
MODULE-I **Complex Trigonometry**: Complex Numbers: Definitions & properties. Modulus and amplitude of a complex number, Argand's diagram, De-Moivre's theorem (without proof). **Vector Algebra**: Scalar and vectors. Vectors addition and subtraction. Multiplication of vectors(Dot and Cross products). Scalar and vector triple products-simple problems	**L1**	**08**
MODULE-II **Differential Calculus**: Review of successive differentiation. Formulae for n^{th} derivatives of standard functions- Liebnitz's theorem(without proof). Polar curves –angle between the radius vector and the tangent pedal equation- Problems. Maclaurin's series expansions- Illustrative examples. Partial Differentiation : Euler's theorem for homogeneous functions of two variables. Total derivatives-differentiation of composite and implicit function. Application to Jacobians.	**L1 & L2**	**10**
MODULE-III **Integral Calculus**: Statement of reduction formulae for $sin^n x$, $cos^n x$, *and* $sin^m x cos^n x$ and evaluation of these with standard limits-Examples. Double and triple integrals-Simple examples.	**L1 & L2**	**08**

MODULE-IV **Vector Differentiation**: Differentiation of vector functions. Velocity and acceleration of a particle moving on a space curve. Scalar and vector point functions. Gradient, Divergence, Curl and Laplacian (Definitions only). Solenoidal and irrotational vector fields-Problems.	**L1 & L2**	**08**
MODULE-V **Ordinary differential equations (ODE's):** Introduction-solutions of first order and first degree differential equations: homogeneous**,** exact, linear differential equations of order one and equations reducible to above types	**L1 & L2**	**06**

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

1. Understand the fundamental concepts of complex numbers and vector algebra to analyze the problems arising in related area.
2. Use derivatives and partial derivatives to calculate rates of change of multivariate functions.
3. Learn techniques of integration including double and triple integrals to find area, volume, mass and moment of inertia of plane and solid region.
4. Analyze position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
5. Recognize and solve first-order ordinary differential equations occurring in different branches of engineering.

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 Book:

B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, New Delhi, 43rd Ed., 2015.

Reference books:

1. *E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2015.*
2. *N.P.Bali and Manish Goyal: Engineering Mathematics, Laxmi Publishers,7th Ed., 2007.*