

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E.SYLLABUS FOR 2017-2021

ADDITIONAL MATHEMATICS - I

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

Course Code : 17MATDIP31

Contact Hours/Week : 03

Total Hours: 40

Semester: III

CIE Marks :00

SEE Marks: 60

Exam Hours:03

Credits: 00

Course Objectives:

The mandatory learning course 17MATDIP31 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
<u>MODULE-I</u> 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
<u>MODULE-II</u> Differential Calculus: Review of successive differentiation. Formulae for n^{th} derivatives of standard functions-Problems on e^{ax} , $\sin(ax+b)$, $\cos(ax+b)$, $(ax+b)^m$ and $1/(ax+b)$ only. 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: Basic concepts.Homogeneous functions of two variables-Euler's theorem-problems on first order derivatives only. Total derivatives-differentiation of composite and implicit function. Jacobians-Problems	L1 & L2	10
<u>MODULE-III</u> 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
<u>MODULE-IV</u> 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 (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. Equations reducible to exact only and Bernoulli's equation.	L1 & L2	06
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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:

Note:- The SEE question paper will be set for 100 marks and the marks will be proportionately reduced to 60.

- The question paper will have **ten** full questions carrying equal marks.
- Each full question consisting of **20** 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.*

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E.SYLLABUS FOR 2017-2021

ADDITIONAL MATHEMATICS - II

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

Course Code : 17MATDIP41

Contact Hours/Week : 03

Total Hours: 40

Semester: IV

CIE Marks :00

SEE Marks: 60

Exam Hours:03

Credits: 00

Course Objectives:

The mandatory learning course 17MATDIP41 viz., **Additional Mathematics-II** aims to provide essential concepts of linear algebra, introductory concepts of second & higher order differential equations along with methods to solve them, Laplace & inverse Laplace transforms and elementary probability theory.

MODULE	RBT Levels	No. of Hrs
<u>MODULE-I</u> Linear Algebra: Introduction - rank of matrix by elementary row operations - Echelon form. Consistency of system of linear equations - Gauss elimination method. Eigen values and eigen vectors of a square matrix. Application of Cayley-Hamilton theorem (without proof) to compute the inverse of a matrix-Examples.	L1 & L2	08
<u>MODULE-II</u> Higher order ODE's: Linear differential equations of second and higher order equations with constant coefficients. Homogeneous /non-homogeneous equations. Inverse differential operator method for $f(D)y=R(x)$ where $R(x)= e^{ax}, \sin(ax), \cos(ax)$, and polynomial in x only. Method of undetermined coefficients and variation of parameters.	L1 & L2	10
<u>MODULE-III</u> Laplace transforms: Laplace transforms of elementary functions. Transforms of derivatives and integrals, transforms of periodic function and unit step function-Problems only.	L1 & L2	08
<u>MODULE-IV</u> Inverse Laplace transforms: Definition of inverse Laplace transforms. Evaluation of inverse transforms by standard methods. Application to solutions of Linear differential equations	L1 & L2	08
<u>MODULE-V</u> Probability: Introduction. Sample space and events. Axioms of probability. Addition and multiplication theorems. Conditional probability – illustrative examples. Bayes's theorem-examples.	L1 & L2	06

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

1. Use matrix theory for solving systems of linear equations in the different areas of linear algebra.
2. Solve second and higher order differential equations occurring in of electrical circuits, damped/un-damped vibrations.
3. Learn the Laplace transforms of standard and periodic functions.
4. Utilize the inverse Laplace transforms to determine general or complete solutions to linear ODE.
5. Explore the basic concepts of elementary probability theory and, apply the same to the problems of decision theory, synthesis and optimization of digital circuits.

Question Paper Pattern:

Note:- The SEE question paper will be set for 100 marks and the marks will be proportionately reduced to 60.

- The question paper will have **ten** full questions carrying equal marks.
- Each full question consisting of **20** 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.*
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