

III Semester

Additional Mathematics-I (Mandatory Learning Course: Common to all Programme) A bridge course for Lateral Entry Students under Diploma quota to BE/B.Tech. programme			
Course Code	21MATDIP31	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0		--
Total Hours of Pedagogy	40 hours		100
Credits	00		
<p>Course objectives: The mandatory learning course 21MATDIP31 viz., Additional Mathematics-I aims to provide basic concepts of complex numbers, vector algebra, differential & integral calculus, vector differentiation and methods of solving first-order differential equations.</p>			
<p>Teaching-Learning Process (General Instructions) These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.</p> <ul style="list-style-type: none"> ➤ The lecture method (L) need not be only the traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. ➤ Use of Video/Animation to explain the functioning of various concepts. ➤ Encourage collaborative (Group Learning) Learning in the class. ➤ Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking. ➤ Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develops design thinking skills such as the ability to design, evaluate, generalize, and analyse information rather than simply recall it. ➤ Show the different ways to solve the same problem and encourage the students to come up with creative ways to solve them. ➤ Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. 			
Module-1			
<p>Differential Calculus: Successive differentiation-problems. Taylor's & Maclaurin's series expansions-problems. Partial Differentiation: Euler's theorem (without Proof)-problems on first order derivatives only. Total derivatives-differentiation of composite functions. Jacobians of order two-Problems.</p> <p style="text-align: right;">(RBT Levels: L1, L2 and L3) 8 Hours</p>			
Pedagogy	Chalk and talk method/PowerPoint Presentation.		
Module-2			
<p>Complex Numbers: Definitions and properties. Modulus and amplitude of a complex number, Argand's diagram, De-Moivre's theorem (without proof), Problems.</p> <p>Vector Algebra: Scalar and vectors. Addition, subtraction and multiplication of vectors- Dot and Cross products, problems. Scalar triple product, Problems.</p> <p style="text-align: right;">(RBT Levels: L1, L2 and L3) 8 Hours</p>			
Pedagogy	Chalk and talk method/PowerPoint Presentation.		
Module-3			
<p>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-simple problems. Solenoidal and irrotational vector fields-Problems.</p> <p style="text-align: right;">(RBT Levels: L1, L2 and L3) 8 Hours</p>			
Pedagogy	Chalk and talk method/PowerPoint Presentation.		

Module-4	
<p>Integral Calculus: Review of elementary integral calculus. Reduction formulae for $\sin^n x$, $\cos^n x$, $\sin^n x \cos^n x$ (without proof) and evaluation of these with standard limits-problems. Double and triple integrals-Simple problems. 8 Hours</p> <p>(RBT Levels: L1, L2 and L3)</p>	
Pedagogy	Chalk and talk method/PowerPoint Presentation.
Module-5	
<p>Ordinary Differential Equations (ODEs): Introduction-solutions of first order and first-degree differential equations: Variable separable method, Homogeneous differential equations, linear differential equations. Exact differential equations. 8 Hours</p> <p>(RBT Levels: L1 L2 and L3)</p>	
Pedagogy	Chalk and talk method/PowerPoint Presentation.
<p>Course outcome (Course Skill Set)</p> <p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> • CO1: Use derivatives and partial derivatives to calculate the rate of change of multivariate functions. • CO2: Apply concepts of complex numbers and vector algebra to analyse the problems arising in a related area. • CO3: Analyse position, velocity and acceleration in two and three dimensions of vector-valued functions. • CO4: Learn techniques of integration including the evaluation of double and triple integrals. • CO5: Identify and solve first-order ordinary differential equations. 	
<p>Assessment Details (CIE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 100%. The minimum passing mark for the CIE is 40% of the maximum marks(100). A student shall be deemed to have satisfied the academic requirements if the student secures not less than 40% (40 Marks out of 100) in the CIE.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour)</p> <ol style="list-style-type: none"> 1. The first test at the end of 5th week of the semester 2. The second test at the end of the 10th week of the semester 3. Third test at the end of the 15th week of the semester <p>Two assignments each of 10 Marks</p> <ol style="list-style-type: none"> 4. First assignment at the end of the 4th week of the semester 5. Second assignment at the end of the 9th week of the semester <p>Course Seminar suitably planned to attain the COs and POs for 20 Marks (duration 01 hours).</p> <p>The sum of three tests, two assignments, and a seminar will be out of 100 marks</p> <p>The student shall secure a minimum of 40% of marks of the course to qualify and become eligible for the award of a degree.</p>	
<p>Suggested Learning Resources:</p> <p>Books</p> <ol style="list-style-type: none"> 1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 43rd Edition, 2015. 2. Advanced Engineering Mathematics, E. Kreyszig John, Wiley & Sons, 10th Edition, 2015. 3. Engineering Mathematics, N. P. Bali and Manish Goyal, Laxmi Publishers, 7th Edition, 2007. 4. Higher Engineering Mathematics, H. K. Das and Er. Rajnish Verma, S. Chand & Company 	

PVT.LTD, Third Revised Edition 2014.

Web links and Video Lectures (e-Resources):

- <http://.ac.in/courses.php?disciplineID=111>
- [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
- <http://academicearth.org/>
- VTU EDUSAT PROGRAMME-20

Activity-Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quiz
- Group assignment
- Seminars