

## BLOW UP SYLLABUS

### VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI Fourth Semester B.E Mathematics Syllabus for Mechanical Engg. & Allied branches Complex Analysis, Probability and Linear Programming - 21MATME41 (Effective from the academic year 2022-23)

Topics	Topics to be covered	Hours
<b>MODULE- 1: Calculus of complex functions</b>		
Analytic functions, Cauchy-Riemann equations in Cartesian and polar forms and consequences.	Discussion restricted to problems in Articles No. 20.3, 20.4 of Textbook 1.	<b>2L</b>
Applications to flow problems. Construction of analytic functions by Milne-Thomson method, Problems.	Discussion of the problems in Articles No. 20.5, 20.6 of Textbook 1.	<b>2L</b>
<b>Tutorials</b>	i) Involvement of faculty and students in identifying the problems & solutions. ii) <b>PPT presentations by the faculty about the applications of the module</b> iii) Guidance to the students for self-study topics through illustrative examples.	<b>4T</b>
<b>Self-Study:</b> Review of functions of a complex variable, limits, continuity and differentiability.	<b>Articles No. 20.1, 20.2 of Textbook 1.</b> <b>1. No Question is to be set for SEE.</b> <b>2. 20% weightage shall be given to CIE from self-study topics.</b>	
<b>RBT Levels : L1, L2 &amp; L3</b>	<b>Total</b>	<b>8 hours</b>
<b>MODULE-2: Conformal transformations</b>		
Introduction, Discussion of transformations: $w = z^2, w = e^z, w = z + 1/z$ . Bilinear transformations - Problems.	<b>Articles No. 20.7, 20.8, and 20.8 of Textbook 1.</b>	<b>2L</b>
<b>Complex integration:</b> Line integral of a complex function, Cauchy's theorem and Cauchy's integral formula and problems.	Discussion of statements and proofs of the theorems and problems in Articles No 20.12, 20.13 & 20.14 of Textbook 1.	<b>2L</b>
<b>Tutorials</b>	i) Involvement of faculty and students in identifying the problems & solutions. ii) <b>PPT presentations by the faculty about the applications of the module-</b> iii) Guidance to the students for self-study topics through illustrative examples.	<b>4T</b>
<b>Self-Study:</b> Residues and Residue Theorem-Problems	<b>Article No. 20.18 and 20.19 of Textbook 1.</b> <b>1. No Question is to be set for SEE</b> <b>2. 20% weightage shall be given to CIE from self-study topics</b>	
<b>RBT Levels: L1, L2 &amp; L3</b>	<b>Total</b>	<b>8hours</b>
<b>MODULE-3: Probability distributions</b>		
Review of basic probability theory. Random variables (discrete and continuous), probability mass and density functions. Mean, variance and standard deviation of a random variable	Discussion of Problems in Article No 26.7, 26.8, 26.9, 26.10(1)&(2) of Textbook 1	<b>2L</b>

Binomial, Poisson, Exponential and normal distributions- problems. (derivations for mean and standard deviation for Binomial and Poisson distributions only)-Illustrative example	Discussion of Problems in Article No 26.14, 26.15, 26.16, 26.19 (6) of Textbook 1	<b>2L</b>
<b>Tutorials</b>	i) Involvement of faculty and students in identifying the problems & solutions. ii) <b>PPT presentations by the faculty about the applications of the module</b> iii) Guidance to the students for self-study topics through illustrative examples.	<b>4T</b>
<b>Self-Study:</b> Two-dimensional random variables, Marginal pdf, Independent random variables.	<b>Article No. 20.1 of Reference book 1.</b> 1. <b>No Question is to be set for SEE</b> 2. <b>20% weightage shall be given to CIE from self-study topics</b>	
<b>RBT Levels: L1, L2 &amp; L3</b>	<b>Total</b>	<b>8hours</b>
<b>MODULE-4: Linear Programming problems</b>		
General linear programming problems, canonical and standard forms of L.P.P. Basic solution, Basic feasible solution, Optimal solution.	Discussion of Problems in Article No 34.1, 34.5, 34.6 of Textbook 1.	<b>2L</b>
Simplex method-Problems, Artificial variables, Big-M method, Two-Phase method-Problems.	Discussion of Problems in Articles No 34.7, 34.8, 34.9 of Textbook 1.	<b>2L</b>
<b>Tutorials</b>	i) Involvement of faculty and students in identifying the problems & solutions. ii) <b>PPT presentations by the faculty about the applications of the module.</b> iii) Guidance to the students for self-study topics through illustrative examples.	<b>4T</b>
<b>Self-Study:</b> Formulation of L.P.P and Optimal solution by Graphical method.	<b>Article No. 34.2 and 34.3 of Textbook 1.</b> 1. <b>No Question is to be set for SEE</b> 2. <b>20% weightage shall be given to CIE from self-study topics.</b>	
<b>RBT Levels:L1, L2 &amp; L3</b>	<b>Total</b>	<b>8hours</b>
<b>MODULE-5: Transportation and Assignment Problem</b>		
Formulation of transportation problem, Initial Basic feasible solution by North-West Corner method, Least cost method, Vogel's approximation method. Optimal solutions-Problems	Discussion of Problems in Articles No 34.14, 34.15 of Textbook 1 (no questions to be set from North-west and least cost methods for basic feasible solution)	<b>3L</b>
Formulation of assignment problems, Hungarian method-Problems	Discussion of Problems in Articles No 34.17, 34.18 of Textbook	<b>1L</b>
<b>Tutorials</b>	i) Involvement of faculty and students in identifying the problems & solutions. ii) <b>PPT presentations by the faculty about the applications of the Module-Finding approximate solutions of ODE related to Mechanical engineering problems.</b> iii) Guidance to the students for self-study topics through illustrative examples.	<b>4T</b>

<b>Self-Study:</b> Degeneracy in Transportation Problem	<b>Article No. 34.16 of Textbook 1.</b> 1. <b>No Question is to be set for SEE</b> 2. <b>20% weightage shall be given to CIE from self-study topics.</b>	
<b>RBT Levels: L1, L2 &amp; L3</b>	<b>Total</b>	<b>8 hours</b>

**Textbooks:**

1. **B.S. Grewal:** “Higher Engineering Mathematics”, Khanna Publishers, 43<sup>rd</sup> Ed., 2015.
2. **E. Kreyszig:** “Advanced Engineering Mathematics”, John Wiley & Sons, 10<sup>th</sup> Ed.(Reprint), 2016.

**Reference Books:**

1. **V. Ramana:** “Higher Engineering Mathematics” McGraw-Hill Education, 11<sup>th</sup> Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia:** “Engineering Mathematics” Oxford University Press, 3<sup>rd</sup> Ed., 2016.
3. **N.P Bali and Manish Goyal:** “A Textbook of Engineering Mathematics” Laxmi Publications, 10<sup>th</sup> Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** “Advanced Engineering Mathematics” McGraw – Hill Book Co., New York, 6<sup>th</sup> Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** “Engineering Mathematic for Semester I and II”, McGraw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** “Higher Engineering Mathematics” S. Chand Publication, 3<sup>rd</sup> Ed., 2014.
7. **James Stewart:** “Calculus” Cengage Publications, 7<sup>th</sup>Ed., 2019.

**Web links and Video Lectures:**

1. <http://nptel.ac.in/courses.php.disciplineID=111>
2. [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
3. <http://academicearth.org/>
4. VTUEDUSATPROGRAMME -20