

**BLOW UP SYLLABUS**  
**Mathematics-III for CS & Engineering (BCS 301)**  
 (Effective from the academic year 2023-24)

Topics	Topics To be Covered	Hours
<b>Module-1: Probability Distributions</b>		
Review of basic probability theory. Random variables (discrete and continuous), probability mass and density functions. Mathematical expectation, mean and variance.	Discussion and coverage of contents as suggested in articles No.3.1, 3.2, 3.3, 4.1, and 4.2 (Problems related to one-dimensional random variable only) of Textbook 1.	<b>4L</b>
Binomial, Poisson and normal distributions-problems (derivations for mean and Standard deviation for Binomial and Poisson distributions only)-Illustrative examples. Exponential distribution.	Discussion and coverage of contents as suggested in articles 26.14, 26.15, 26.16, 26.17, and 26.19(6) of the Textbook 2. (problems restricted to the above articles)	<b>4L</b>
<b>(RBT Levels: L1, L2 and L3)</b>		
<b>Tutorials</b>	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. applications by the Faculty, about the module.	<b>2T</b>
<b>Total</b>		<b>10 Hours</b>
<b>Module-2: Joint probability distribution &amp; Markov Chain</b>		
<b>Joint probability distribution:</b> Joint Probability distribution for two discrete random variables, expectation, covariance and correlation.	Discussion and coverage of contents as suggested in articles No. 3.4, 4.1 to 4.3 of Textbook 1. (Problems related to two-dimensional random variables only)	<b>3L</b>
<b>Markov Chain:</b> Introduction to Stochastic Process, Probability Vectors, Stochastic matrices, Regular stochastic matrices, Markov chains, Higher transition probabilities, Stationary distribution of Regular Markov chains and absorbing states.	Discussion and coverage of contents as suggested in article No. 31.2. of Reference Book 3(B V. Ramana).	<b>5L</b>
<b>(RBT Levels: L1, L2 and L3)</b>		
<b>Tutorials</b>	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. Applications by the faculty, about the module.	<b>2T</b>
<b>Total</b>		<b>10 Hours</b>

<b>Module-3: Statistical Inference 1</b>		
Introduction, sampling distribution, standard error, testing of hypothesis, levels of significance, test of significances, confidence limits,	Discussion and coverage of contents as suggested in articles 27.1 to 27.5 of Textbook 2. (problems restricted to the above articles)	<b>4L</b>
Simple sampling of attributes. Test of significance for large samples, comparison of large samples	Discussion and coverage of contents as suggested in articles 27.6 to 27.8 of Textbook 2. (Problems restricted to the above articles)	<b>4L</b>
<b>(RBT Levels: L1, L2 and L3)</b>		
<b>Tutorials</b>	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. Applications by the faculty, about the module.	<b>2T</b>
<b>Total</b>		<b>10 Hours</b>
<b>Module-4: Statistical Inference 2</b>		
Sampling variables, central limit theorem and confidences limit for unknown mean.	Discussion and coverage of contents as suggested in articles No.8.1 to 8.5 and 9.4 of Textbook 1.	<b>4L</b>
Test of Significance for means of two small samples, students 't' distribution, Chi-square distribution as a test of goodness of fit. F-Distribution.	Discussion and coverage of contents as suggested in articles 27.13 to 27.19 of Textbook 2.	<b>4L</b>
<b>(RBT Levels: L1, L2 and L3)</b>		
<b>Tutorials</b>	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. Applications by the faculty, about the module.	<b>2T</b>
<b>Total</b>		<b>10 Hours</b>
<b>Module-5: Design of Experiments &amp; ANOVA</b>		
Principles of experimentation in design, Analysis of completely randomized design, randomized block design. The ANOVA Technique, Basic Principle of ANOVA, One-way ANOVA	Discussion and coverage of contents as suggested in articles No.13.1, 13.2, 13.3 and 13.11 of Textbook 1.	<b>4L</b>
Two-way ANOVA, Latin-square Design, and Analysis of Co-Variance.	Discussion and coverage of contents as suggested in articles No. 12.4, 12.5 and 12.6 of Reference Book 4. Discussion on Analysis of Covariance (No problems to be asked in the Exam)	<b>4L</b>

(RBT Levels: L1, L2 & L3)		
<b>Tutorials</b>	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. Applications by the faculty, about the module.	<b>2T</b>
<b>Total</b>		<b>10 Hours</b>

**Suggested Learning Resources:**

**Textbooks 1:** Ronald E. Walpole, Raymond H Myers, Sharon L Myers & Keying Ye “**Probability & Statistics for Engineers & Scientists**”, Pearson Education, 9th edition, 2017.

**Textbook 2:** B. S. Grewal “**Higher Engineering Mathematics**”, Khanna publishers, 44<sup>th</sup> Ed., 2021.

**Textbook 3:** Peter Bruce, Andrew Bruce & Peter Gedeck “**Practical Statistics for Data Scientists**” O’Reilly Media, Inc., 2nd edition 2020.

**Reference Books:**

1. Erwin Kreyszig, “**Advanced Engineering Mathematics**”, John Wiley & Sons, 9<sup>th</sup> Edition, 2006.
2. G Haribaskaran “**Probability, Queuing Theory & Reliability Engineering**”, Laxmi Publication, Latest Edition, 2006
3. B.V. Ramana: “**Higher engineering mathematics**” Tata McGraw-Hill Publishers, Fifth reprint 2008.
4. C R Kothari and Gaurav Garg “**Research Methodology Methods & Techniques**” New Age International Limited, 3<sup>rd</sup> Edition, 2014.
5. Irwin Miller & Marylees Miller, John E. Freund’s “**Mathematical Statistics with Applications**” Pearson. Dorling Kindersley Pvt. Ltd. India, 8<sup>th</sup> edition, 2014.
6. S C Gupta and V K Kapoor, “**Fundamentals of Mathematical Statistics**”, S Chand and Company, Latest edition.
7. Robert V. Hogg, Joseph W. McKean & Allen T. Craig. “**Introduction to Mathematical Statistics**”, Pearson Education 7<sup>th</sup> edition, 2013.
8. Jim Pitman. “**Probability**”, Springer-Verlag, 1993.
9. Sheldon M. Ross, “**Introduction to Probability Models**” 11<sup>th</sup> edition. Elsevier, 2014.
10. A. M. Yaglom and I. M. Yaglom, “**Probability and Information**”, D. Reidel Publishing Company. Distributed by Hindustan Publishing Corporation (India) Delhi, 1983.
11. P. G. Hoel, S. C. Port and C. J. Stone, “**Introduction to Probability Theory**”, Universal Book Stall, (Reprint), 2003.
12. S. Ross, “**A First Course in Probability**”, Pearson Education India, 6<sup>th</sup> Ed., 2002
13. N.P. Bali and Manish Goyal, “**A Textbook of Engineering Mathematics**”, Laxmi Publications, Reprint, 2010.
14. Veerarajan T, “**Engineering Mathematics (for semester III)**”, Tata McGraw-Hill, New Delhi, 2010

**Web links and Video Lectures (e-Resources):**

<http://nptel.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/>  
<http://www.bookstreet.in>

VTU e-Shikshana Program

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

- Programming Assignment
- Seminars