

NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI- 620 015

DEPARTMENT OF MATHEMATICS

COURSE OUTLINE TEMPLATE			
Course Title	Numerical Methods and Applied Statistics		
Course Code	MA601	No. of Credits	3
Department	Mathematics	Faculty	Dr. R. Tamil Selvi
Pre-requisites Course Code	B. Tech. Engineering Mathematics		
Name of Course Course	M.Tech. Environmental Engineering		
Other Course Teacher(s)/Tutor(s)	Email Id	Telephone No.	
1	Dr. R. Tamil Selvi	tamil@nitt.edu	7598176202
Course Type	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
COURSE OVERVIEW			
<p>To understand the mathematical applications to engineering problems using Numerical Techniques, Linear Programming Concept, Standard distributions, ,Sampling distributions, and Time Series Analysis.</p>			
COURSE OBJECTIVES			
<ul style="list-style-type: none"> • To make the students mathematically strong for solving engineering problems. • To provide the required fundamental concepts in numerical methods, probability and statistics. • To introduce the basic concepts of n- dimensional random variables and their applications, n-random samples and time series analysis. 			
COURSE OUTCOMES (CO)			
Course Outcomes		Aligned Programme Outcomes (PO)	
<ol style="list-style-type: none"> 1. To apply the principles and techniques learnt in this course for solving the practical problems which arise in the industry 2. To formulate real problems with multi dimensions 3. To develop student's problem solving skill in their domain. 		<p>The Engineering Graduates will apply their knowledge of mathematics to engineering problems.</p>	

COURSE TEACHING AND LEARNING ACTIVITIES			
S. No.	Week	Topic	Mode of Delivery
	Week-1	1. Random variables-1 dim, 2 dim 2. Standard distributions-Binomial 3. Poisson + Tutorial	Chalk and Talk
	Week - 2	4. Normal distribution 5. M.G.F. 6. Tutorial	
	Week-3	7. Correlation-rank 8. Partial-Multiple 9. Tutorial	
	Week-4	10. Regression 11. Multiple Regression 12. Curve Fitting	
	Week-5	13. Linear system-Direct methods- Gauss Elimination 14. Gauss Jordan- Finding Inverse 15. Direct methods-Gauss Jacobi+ Tutorial	
	Week-6	16. Gauss seidel, 17. Regula falsi method 18. N. R. method. + Tutorial Assessment-I	
	Week-7	Interpolation 19. Forward, Backward 20. Lagranges 21. Introduction to L.P, Graphical method + Tutorial	Chalk and Talk
	Week-8	22. Graphical Method-More problems 23. Simplex 24. Big-M method + Tutorial	
	Week -9	25. Two phase method-problems 26. Dual problems-dual simplex 27. Sensitivity Analysis-problems	Chalk and Talk
	Week-10	28. Integer programming 29. Transportation & Assignment problems 30. Sampling-large	
	Week - 11	31. Small sampling 32. Chi-square test 33. Tutorial	

	Week-12	34. ANOVA- one way 35. Two way 36. Latin square Assessment-II	Chalk and Talk
	Week -13	37. Time series analysis-problems 38. More problems 39. Tutorial 40. Revision Assessment-III	Chalk and Talk

COURSE ASSESSMENT METHODS

S. No.		Week/Date	Duration	% Weightage
1.	Assessment-I	6th week	1 Hour	20%
2.	Assessment-II	12th week	1 Hour	20%
3.	Reassessment	13th week	1 Hour	
4.	Assignment			10%
5.	Assessment-III		3 Hours	50%
				Total : 100 Marks

ESSENTIAL READINGS : Textbooks, Reference books, Website addresses, Journals, Softwares etc.

MA601-NUMERICAL METHODS AND APPLIED STATISTICS (2016 Batch Onwards)

Linear system – Gaussian elimination and Gauss – Jordan methods – matrix inversion – Gauss seidel method – Nonlinear equations – Regula falsi and Newton- Raphson methods – interpolation – Newton's and Lagrange's interpolation.

Linear Programming – Graphical and Simplex methods – Big-M method - Two phase method - Dual simplex method - Dual theory – Sensitivity analysis – Integer programming – Transportation and Assignment problem.

Random variable – two dimensional random variables – standard probability distributions – Binomial Poisson and normal distributions - moment generating function.

Sampling distributions – confidence interval estimation of population parameters – testing of hypotheses – Large sample tests for mean and proportion – t-test, F-test and Chi-square test.

Curve fitting-method of least squares Regression and correlation – rank correlation – multiple and partial correlation.

Analysis of variance-one way and two way classifications – experimental design – Latin square design – Time series analysis.

Reference Texts:

1. Bowker and Liberman, *Engineering Statistics*, Prentice-Hall, 1972.
2. Venkatraman, M.K., *Numerical Methods in Science and Engineering*, National Publisher Company.
3. Numerical Methods for scientific and engineering computation, M.K.JAIN,S.R.K.IYENGAR and R.K.JAIN, 5TH edition, New Age International (p) Limited,2007.
4. Operations Research: An introduction, HAMDY A. TAHA, 8TH edition, Pearson Prentice Hall, 2007.
- 5.Fundamentals of Statistics, S.C.Gupta, Himalaya Publishing House, Seventh Revised Edition,2009.
6. Fundamentals of Mathematical Statistics, S.C.Gupta and V.K.KAPOOR Sultan Chand and Sons, Eleventh Revised Edition.

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

1. Examination:

- a) Students who have missed the assessment – I or assessment - II or both can register for **Re-Test** which shall be conducted soon after the completion of the assessment – II and before the regular semester examination (assessment – III).
- b) The Re-Test examination shall be conducted for 20 marks comprising the syllabus of both assessment – I and assessment - II.
- c) Students should submit assignments before last date of submission. In case students fail to submit their assignments, he/she will get zero mark for that particular assignment.

2. Attendance:

- a) The minimum attendance for appearing for the semester examination is 75%.
- b) Those students, whose attendance falls below 75% but above and equal to 50% in a subject, shall attend mandatory classes before the semester examinations to qualify to write semester exam.
- c) The students who are having attendance less than 50% or have not attended mandatory classes has to redo the course in next semester.

FOR SENATE'S CONSIDERATION

Dr. R. Tamil Selvi
sd

Dr. Deendayal
sd

Dr. Samson Mathew
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Course Faculty _____

CC-Chairperson _____

HOD _____