



DEPARTMENT OF MATHEMATICS

COURSE PLAN – PART I			
Name of the programme and specialization	M. Tech. in Civil Engineering (Specialization: Environmental Engineering)		
Course Title	Numerical Methods and Applied Statistics		
Course Code	MA601	No. of Credits	03
Course Code of Pre-requisite subject(s)	NIL		
Session	July 2021	Section (if, applicable)	-
Name of Faculty	Dr. R. Gowthami	Department	Mathematics
Official Email	gowthami@nitt.edu	Telephone No.	+91 8903844986
Name of Course Coordinator(s) (if, applicable)	-		
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<ul style="list-style-type: none"> 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. 			
TEXT BOOKS			
1) Bowker and Liberman, Engineering Statistics, Prentice-Hall, 1972.			



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

COURSE OBJECTIVES

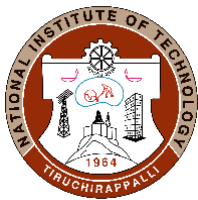
- To learn the different numerical techniques
- To know the concepts of linear programming
- To be introduced to the fundamentals of probability
- To be introduced to the sampling theory
- To know the concepts of regression

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
Understand and apply the methodologies to solve linear systems and nonlinear equations using known numerical methods.	PO 5
Understand the formulation of linear programming and the methods to solve them.	PO 5
Understand the basics of probability, random variable and to familiarize with discrete and continuous probability distributions.	PO 5
Correlate any results using statistical methods.	PO 5
Develop statistical models between variables.	PO 5

COURSE PLAN – PART II

COURSE OVERVIEW



This course will introduce

- (i) numerical methods to solve linear and nonlinear equations and interpolations.
- (ii) the formulation of linear programming and the methods to solve them.
- (iii) probability, random variables and distributions.
- (iv) sampling theory and various hypothesis tests.
- (v) methods to examine regression and correlation.

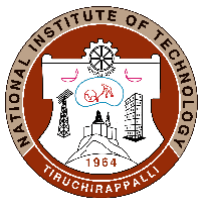
COURSE TEACHING AND LEARNING ACTIVITIES

(Add more rows)

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Weeks-1,2,3,4	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	Online Mode
2	Weeks-4,5	Linear Programming – Graphical and Simplex methods – Big-M method - Two phase method - Dual simplex method - Dual theory – Sensitivity analysis – Integer programming – applications.	
3	Weeks-5,6	Random variable – two dimensional random variables – standard probability distributions – Binomial Poisson and normal distributions - moment generating function	
4	Weeks-6, 7, 8	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.	
5	Weeks-9, 10, 11	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.	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment 1	Week 8	1 Hour	20%



2	Assessment 2	Week 12	1 Hour	20%
3	Assignment 1	--	--	10%
4	Assignment 2	--	--	10%
5	Assignment 3	--	--	10%
CPA	Compensation Assessment*	Week 15	1 Hour	20%
6	Final Assessment *	Week 16	3 Hours	30%

***mandatory; refer to guidelines on page 4**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1. Feedback from students during class committee meeting.
2. Anonymous feedback through questionnaire (as followed previously by the Institute).
3. Students can approach the faculty (with prior appointment) at any stage in the course duration in case he/she finds difficulty in understanding the concept.
4. Student knowledge about the topic covered in this course will be judged through marks obtained in examination.

COURSE POLICY (including compensation assessment to be specified)

Examination Policy:

- a) Students who have missed the first or second assessment or both assessments for genuine reasons only can register for the Assessment - III examination which shall be conducted soon after the completion of the second assessment test and before the regular semester examination.
- b) The Assessment - III examination shall be conducted for 20 marks comprising the syllabus of both first and second assessment tests.
- c) Students should submit the assignments before the last date of submission. In case students fail to submit their assignments; he/she will get zero mark for that particular assignment.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY

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FOR APPROVAL

Course Faculty

Syouthami

CC- Chairperson

J. Kathiray

HOD

C. R.
Head
Department of Civil Engineering
National Institute of Technology
Tiruchirappalli - 620 015.