



**NATIONAL INSTITUTE OF TECHNOLOGY,
TIRUCHIRAPPALLI**

DEPARTMENT OF MATHEMATICS

COURSE PLAN – PART I			
Name of the programme and specialization	B-Tech ECE		
Course Title	Linear Algebra and Calculus		
Course Code	MAIR12	No. of Credits	3
Course Code of Pre-requisite subject(s)	-	-	-
Session	July 2023	Section (if, applicable)	B
Name of Faculty	Dr. Gautam Singh	Department	Mathematics
Official Email	gautam@nitt.edu	Telephone No.	9085857312
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)			
<p>Vector space – Subspaces – Linear dependence and independence – Spanning of a subspace– Basis and Dimension. Inner product – Inner product spaces – Orthogonal and orthonormal basis – Gram Schmidt orthogonalization process. Linear transformation. Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem. Quadratic form;</p> <p>Sequence and series: Convergence of sequence. Infinite Series-Tests for Convergence-Integral test, comparison test, Ratio test, Root test, Raabe's test, Logarithmic test and Leibnitz's test; Power series;</p> <p>Functions of two variables: Limit, continuity and partial derivatives; Total derivative, Jacobian, Taylor series, Maxima, minima and saddle points; Method of Lagrange multipliers; Double and triple integrals, change of variables, multiple integral in cylindrical and spherical coordinates.</p> <p>1. Dennis Zill, Warren S. Wright, Michael R. Cullen, Advanced Engineering Mathematics, Jones & Bartlett Learning, 2011</p> <p>2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2019.</p> <p>3. Strauss M.J, G.L. Bradley and K.J. Smith, Multivariable Calculus, Prentice Hall, 2002.</p> <p>4. Ward Cheney, David Kincaid, Linear Algebra: Theory and Applications, Jones & Bartlett Publishers, 2012.</p> <p>5. Hoffman, K. and Kunze, R., Linear algebra. 1971. Englewood Cliffs, New Jersey.</p>			



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COURSE OBJECTIVES	
Objective of the course are as follows:	
<ol style="list-style-type: none">1. Introduce vector space and inner product space and its properties.2. Introduce eigen value and eigen vectors and its properties.3. Determine canonical form of given quadratic form.4. Discuss the convergence of infinite series.5. Analyze and discuss the extrema of the functions of several variables.6. Evaluate the multiple integrals and apply in solving problems	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
On completion of this course students will be able to: <ul style="list-style-type: none">• Explain vector spaces, subspaces, and related concepts• Explain Inner Product Spaces and Linear Transformations• Calculate eigen values and eigen vectors of a matrix• Check the convergence of sequence and series• Perform multiple integration with applications	1

COURSE PLAN – PART II
COURSE OVERVIEW
This course will introduce: <ol style="list-style-type: none">1. The basic concepts in Linear Algebra Calculus and2. Methods to solve various kinds of important problems in Linear Algebra Calculus3. Convergence and divergence of sequence and infinite series4. Find the limit, continuity and partial derivative5. Find double and triple integrals



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COURSE TEACHING AND LEARNING ACTIVITIES (Add more rows)				
S.No.	Week/Contact Hours	Topic	Mode of Delivery	
1	Week 1,2,3	Sequence and series: Convergence of sequence. Infinite Series-Tests for Convergence-Integral test, comparison test, Ratio test, Root test, Raabe's test, Logarithmic test and Leibnitz's test; Power series;	Chalk and Talk	
2	Week 4,5,6,7,8	Functions of two variables: Limit, continuity and partial derivatives; Total derivative, Jacobian, Taylor series, Maxima, minima and saddle points; Method of Lagrange multipliers; Double and triple integrals, change of variables, multiple integral in cylindrical and spherical coordinates.	Chalk and Talk	
3	Week 9,10,11,12,13,14	Vector space - Subspaces - Linear dependence and independence - Spanning of a subspace- Basis and Dimension. Inner product - Inner product spaces - Orthogonal and orthonormal basis - Gram Schmidt orthogonalization process. Linear transformation. Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem. Quadratic form;	Chalk and Talk	
COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment 1 (Written test)	6 th week	1 hour	20
2	Assessment 2 (Written test)	12 th week	1 hour	20
3	Assessment 3 (Assignments)			10



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CPA	Compensation Assessment*	13 th week	1 hour	
4	Final Assessment *	After 14 th week	3 hour	50

*mandatory; refer to guidelines on page 4

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

1. Students can meet the faculty (with prior appointment) at any stage in the course duration in case he/she finds difficulty in understanding the topic.
2. Feedback form issued to students to express their comments about the course before Assessment -1, and after completing the syllabus. Students are requested to give genuine feedback about the course.
3. 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)

Mode of Correspondence: Students can meet the faculty by fixing appointment through E-mail (gautam@nitt.edu) or phone call (9085857312) in the working days.

Compensation Assessment Policy: Only the students who are absent in any of the Assessment Tests (or both) with genuine reasons (medical emergencies /On Duty) will be allowed to write the compensation test. Students are strictly not allowed to enroll for compensation assessment to improve their marks.

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

- 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.



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- 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

FOR APPROVAL

(Singh)
21-08-2023
Course Faculty

(G. Tharan)
21/8/23
CC- Chairperson
(G. Tharan)
E.C-E

(M. S. S. S. S.)
21/8/23
HOD