

DEPARTMENT OF MATHEMATICS
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	B. Tech, ECE		
Course Title	Mathematics – I		
Course Code	MAIR 11	No. of Credits	4
Course Code of Pre-requisite subject(s)	+2 Mathematics		
Session	July 2018	Section (if, applicable)	A / B
Name of Faculty	Dr. V. Lakshmana Gomathi Nayagam	Department	Mathematics
Email	velulakshmanan@nitt.edu	Telephone No.	9443881718
Name of Course Coordinator(s) (if, applicable)	Not Applicable		
E-mail	Not Applicable	Telephone No.	Not Applicable
Course Type	Core course		
Syllabus (approved in BoS)			
MAIR 11 MATHEMATICS - I			
<p>Characteristic equation of a matrix – Eigen values and Eigen vectors – Properties of Eigen values – Diagonalization of matrix – Cayley-Hamilton Theorem (without proof) verification – Finding Inverse and Power of a matrix using it – Quadratic form – Definite and indefinite forms – Orthogonal reduction of quadratic form to canonical form.</p> <p>Sequences of real numbers (Revision) - Infinite series-Convergence Tests for positive term series – Comparison, Root, Ratio and Raabe’s tests - Alternating series – Leibnitz’s rule – Absolute and Conditional Convergence. Riemann rearrangement theorem (without proof).</p> <p>Functions of several variables – Partial derivatives and Transformation of variables – Jacobian and its Properties- Maxima and Minima of function of two variables.</p> <p>Double integral – Changing the order of Integration – Change of variables from Cartesian to Polar Coordinates – Area using double integral in Cartesian and Polar Coordinates – Triple integral – Change of Variables from Cartesian to Spherical and Cylindrical Coordinates – Volume using double and triple integrals.</p>			
Text Books			
<ol style="list-style-type: none"> 1. Kreyszig, E., ‘Advanced Engineering Mathematics’, 9th edition, John Wiley Sons, 2006. 2. Grewal, B.S., ‘Higher Engineering Mathematics’, 42nd edition, Khanna Publications, Delhi, 2012. 3. M K Venkataraman, ‘Engineering mathematics’, Volume I, 2nd ed., National Publishing Co, 2003. 			

Reference Books	
1. Apostol, T.M. 'Calculus' Volume I & II Second Edition, John Wiley & Sons (Asia) 2005.	
2. Greenberg, M.D. 'Advanced Engineering Mathematics', Second Edition, Pearson Education Inc. (First Indian reprint), 2002	
3. Strauss. M.J, Bradley, G.L. and Smith, K.J. 'Calculus', 3rd Edition, Prentice Hall, 2002.	
4. T Veerarajan, 'Engg Mathematics' McGraw-Hill Education (India) Pvt Limited, 2007	
COURSE OBJECTIVES	
To acquire basic knowledge in mathematics and to apply in engineering disciplines.	
COURSE OUTCOMES (CO)	
Course Outcomes	Aligned Programme Outcomes (PO)
1. To apply matrix analysis for Engineering Problems	1. To apply the knowledge on Mathematics in Complex Engineering problems. (PO1)
2. To formulate real problems with multi dimensions	2. To analyze the complex engineering problems by using the first principles of Mathematics. (PO2)
3. To understand the convergence and divergence of infinite series in practical problems	PO1,PO2

COURSE PLAN – PART II			
COURSE OVERVIEW			
To understand the mathematical applications to engineering problems using matrix theory, convergence concepts of infinite series, functions of several variables and multiple integrals.			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	August 3rd Week	Review of basic definitions on Matrix Theory. Finding Eigen values and Eigen vectors. Finding the roots for symmetric matrices. More Problems +Tutorial	Chalk and Talk/ PPT
	August 5th Week	Properties of Eigen values and Eigen vectors. Caley Hamilton Theorem (CHT) - verification. Applications of CHT. More problems + Tutorial	
	September 1st Week	Diagonalization-problems. More problems Quadratic forms- required definitions. Problems + Tutorial.	

2	September 2nd Week	Revision on Sequences. Series-definitions-series of +ve terms. Problems using the tests. More Problems + Tutorial	Chalk and Talk/ PPT
	September 3rd Week	Assessment-I Assessment-II More problems. Alternating series- Leibnitz test	
	September 4th Week	More problems. Tutorial.	
3	October 1 st week	Differentiation-Review. Partial derivatives-problems. Transformation problems More problems +Tutorial	Chalk and Talk/ PPT
	October 2 nd week	Functions of two variables Problems for max., min. More problems Jacobian + Tutorial	
	October 3 rd week	Assessment-III Assessment-IV	
	October 4th week	Problems. Properties of Jacobian-Problems More problems.	
4	October 5th week	Concept of integration Double and triple integration. Change the order of integration Problems	Chalk and Talk/ PPT
	November 1 st week	More Problems +Tutorial Applications of double integral Problems Other co-ordinate systems	
	November 2nd week	Problems Conversion-problems More Problems Overall revision.	
	December 1st week	Compensation assessment	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	First Assessment (Descriptive Assignment -from first two units)	Sep 3rd week	-	5%
2	Second Assessment (Descriptive - from first two units)	Sep 3rd week (18,19,20)	1 Hour	20%
3	Third assessment (Descriptive Assignment- from third and fourth units)	Oct 3rd week	-	5%
4	Fourth assessment (Descriptive- from third and fourth units)	Oct 3rd week (23,24,25)	1 Hour	20%
5	Compensation assessment for the absentees. (Descriptive- from first four units)	Dec 1st week	1 Hour	20%
6	Final Assessment *	Dec 2nd week	3 Hours	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. Feedback from students during class committee meeting.
2. Anonymous feedback through questionnaire (online).

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

1. If the students fails to appear semester examination due to genuine/medical reason, can register for special end semester examination after approval from course teacher & Head of department of Mathematics/Dean (academic). The special end semester examination will be conducted within ten days from reopening of institute for next semester. Students should register their names with course teacher to appear for special end semester examination within three days from reopening of institute for next semester. Grade issued as per the guidelines followed for his/her batch students.
2. There will be one Reassessment (for 100 marks) for the students who have secured "F" in this course and will be conducted within ten days from reopening of institute for next semester. Students should register their names with course teacher to appear for reassessment within three days from reopening of institute for next semester. If the students satisfy the criteria fixed by the faculty to promote E grade will be given E grade and others given 'F' grade.
3. The passing minimum should be maximum of $\frac{\bar{X}}{2}$ or 35, where \bar{X} is the mean of the class marks.

MODE OF CORRESPONDENCE (email/ phone etc)

Phone _____

COMPENSATION ASSESSMENT POLICY

Absentees of the second assessment or the fourth assessment can only write the compensation assessment test.

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.
- 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

Faculty is available for discussion after the class hours at the Department on the first floor of Lyceum. Room No. 221. Faculty can also be contacted over phone: 9443881718.

FOR APPROVAL

Course Faculty V. Lakshmi

CC-Chairperson

*Disputed
21/08/12
(for
Dr.S.Raghavan)*

HOD [Signature]

Guidelines:

- a) The number of assessments for a course shall range from 4 to 6.
- b) **Every course shall have a final assessment on the entire syllabus with at least 30% weightage.**
- c) **One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.**
- d) **The passing minimum shall be as per the regulations.**

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or class average/2 whichever is greater.		Peak/3 or class average/2 whichever is lower		40%

- e) **Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.**
- f) **Absolute grading policy shall be incorporated if the number of students per course is less than 10.**
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.