



DEPARTMENT OF ___ OF MATHEMATICS ___

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech Electronic and Communication Engineering		
Course Title	Real Analysis and Partial Differential Equations		
Course Code	MAIR34	No. of Credits	3
Course Code of Pre-requisite subject(s)	MAIR11, MAIR21		
Session	July / January <u>19</u>	Section (if, applicable)	A & B (both) ✓
Name of Faculty	Prof. V Ravichandran	Department	Mathematics
Official Email	ravic@nitt.edu/	Telephone No.	0431-2503665
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>MAIR 34: Real Analysis and Partial Differential Equations</p> <p>Real number system. Sets, relations and functions. Properties of real numbers. sequences. Cauchy sequences. Bolzano-Weierstrass and Heine-Borel properties.</p> <p>Functions of real variables. Limits, continuity and differentiability. Taylor's formula. Implicit and inverse function theorems. Extrema of functions.</p> <p>Riemann integral. Mean value theorems. Differentiation under integral sign. Improper and multiple integrals. Change-of-variables formula.</p> <p>Sequences and series of functions. Pointwise and uniform convergence. Power series and Taylor series.</p> <p>Laplace and Helmholtz equations. Boundary and initial value problems. Solution by separation of variables and Eigen function expansion.</p>			



COURSE OBJECTIVES	
<ol style="list-style-type: none"> 1. Introduce real numbers and study their properties 2. Define the limit of a function at a value, a limit of a sequence, and the Cauchy criterion and use them to solve related problems 3. Prove theorems about limits of sequences and functions 4. Define and illustrate continuity of a function and uniform continuity of a function 5. Prove a theorem about continuous functions 6. Define and test convergence of sequence and series of functions 7. Define Riemann integral and prove theorem about it 8. Solve the Laplace and Helmholtz equations 	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. prove various properties of real numbers, the limit of a function at a value, a limit of a sequence, and the Cauchy criterion	
2. prove theorems about limits of sequences and functions	
3. define continuity of a function and uniform continuity of a function and test it for certain functions and prove a theorem about continuous functions	
4. define Riemann integral and prove theorem about Riemann integral	
5. solve the Laplace and Helmholtz equations	

COURSE PLAN – PART II			
COURSE OVERVIEW			
This course will mainly focus on developing an abstract understanding of calculus by introducing various definitions, and proving theorems about real numbers, sequences, functions of real variables, the Riemann integral, and sequences of functions. In addition, certain second order partial differential equations will be solved.			
COURSE TEACHING AND LEARNING ACTIVITIES			
(Add more rows)			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week- 1	Real number system. Sets, relations and functions. Properties of real numbers. Sequences.	Chalk and Talk
2	Week-2	Cauchy sequences. Bolzano-Weierstrass and Heine-Borel properties.	Chalk and Talk



3	Week -3	Functions of real variables. Limits, continuity and differentiability.	Chalk and Talk
4	Week - 4	Taylor's formula. Implicit and inverse function theorems.	Chalk and Talk
5	Week -5	Extrema of functions. Riemann integral. Mean value theorems.	Chalk and Talk
6	Week -6	Mean value theorems. Differentiation under integral sign.	Chalk and Talk
7	Week -7	Differentiation under integral sign. Improper and multiple integrals. Change-of-variables formula.	Chalk and Talk
8	Week -8	Improper and multiple integrals. Change-of-variables formula	Chalk and Talk
9	Week -9	Sequences and series of functions.	Chalk and Talk
10	Week -10	Pointwise and uniform convergence	Chalk and Talk
11	Week -11	Power series and Taylors series.	Chalk and Talk
12	Week -12	Laplace and Helmholtz equations. Boundary and initial value problems.	Chalk and Talk
13	Week -13	Solution by separation of variables and Eigen function expansion.	Chalk and Talk

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Class Test I	6	50min	20%
2	Assignment Test	9	30min	10%
3	Class Test II	11	50min	20%
CPA	Compensation Assessment*	13	50min	20%
5	Final Assessment *	14	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. Students can meet the faculty at any stage in the course duration in case he/she finds difficulty in understanding the concept.
2. Feedback from students during class committee meeting.
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)

- a. Students who have missed the assessment 1 or assessment 2 or both or scored less than 10 marks out of 40 (i.e., assessment 1 marks + assessment 2 marks < 10 marks) can register for Re-Test examination which shall be conducted soon after the completion of the assessment 2 and before the regular semester examination. Other students were strictly NOT allowed to register for Re-Test Examination.
- b. The Re-Test examination shall be conducted for 20 marks comprising the syllabus of both assessment 1 and assessment 2. Those who have missed both tests are assessed only for 20 marks.
- c. Minimum mark of assessment 1 and assessment 2 will be replaced by Re-Test exam mark, if the student score more than minimum mark of assessment 1 and assessment 2. In the case of equal marks in both the assessments and sum of marks less than 10(out of 40), only one of the minimum mark will be replaced by Re-Test mark.
- d. Students need not submit the solutions to the assignment but *they must attend the test* with questions chosen by the faculty from the given assignment questions. *Retest is possible for those who have intimated their absence in advance.*

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.

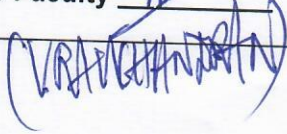
ADDITIONAL INFORMATION, IF ANY

FOR APPROVAL

Course Faculty 

CC- Chairperson 

HOD 





Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory 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.