

NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI- 620 015
DEPARTMENT OF MATHEMATICS

COURSE OUTLINE TEMPLATE		
Course Title	Mathematics – II	
Course Code	MAIR 21	No. of Credits : 4
Department	Mathematics	Section: Production - A and B
Pre-requisites Course Code	MAIR 11 - Mathematics-I	
Course Teacher(s)/Tutor(s)	Email Id	Telephone No.
Dr. A. Shanmuga Vadivu	avshanmugaa@gmail.com	9629739258
Course Type	Core course	
COURSE OVERVIEW		
To understand the fundamental concepts and solve problems on Vector spaces, inner product spaces, Linear differential Equations, Line, Surface, and volume integrals, Analytic functions, conformal mapping, and complex integrations.		
COURSE OBJECTIVES		
<ol style="list-style-type: none"> 1. Introduce the structure vector space and various operations on it. 2. Introduce different method to solve the 2nd order differential equations and its applications in electric circuit problems. 3. Familiarize concepts like differentiations and integration for function of complex variable. 4. Introduce vector differential operator for vector function and important theorems on vector functions to solve engineering problems 		
COURSE OUTCOMES (CO)		
Course Outcomes	Aligned Programme Outcomes(PO)	
After the completion of the course, students are able to <ul style="list-style-type: none"> • Perform standard operation in finite dimensional vector spaces • Compute the dot product of vectors, lengths of vectors, and angles between vectors. • Perform gradient, div, curl operator on vector functions and give physical interpretations. • Use Green's, Gauss divergence and Stoke's theorems to solve engineering problems. • Solve higher order ODEs and interpret it geometrically. • Compute differentiation of functions of complex variable. • Construct analytic function for given real or imaginary part of it. • Find images of the given region by standard functions of complex variable. • Compute bilinear map by knowing the images of three points. 		

COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week	Topic	Mode of Delivery
1.	Week 1	1. First order differential equation and its soln. 2. Higher order homogeneous linear differential Equations and its soln. 3. Particular integrals for Type-I, II, III 4. Problem solving	Chalk and Talk
2.	Week 2	5. Particular Integrals for Type IV, V 6. Particular Integrals for Type VI 7. Equation reducible to linear equations with constant coefficients. 8. More Problems + Tutorial.	Chalk and Talk
3.	Week 3	9. Simultaneous Differential Equations 10. Method of Variation of Parameters 11. Applications – Electric Circuit Problems 12. Tutorial	
4.	Week 4	13. Analytic function, C-R equation. 14. Cartesian and polar form of CR –Eqn 15. Properties and Construction of analytic function. 16. Problems +tutorials.	
5.	Week 5	17. Conformal mapping 18. Problems 19. Bilinear Transformations 20. Problems+Tutorials.	
6.	Week 6	First Assessment 21. Cauchy's integral Theorem 22. Cauchy's integral formula	
7.	Week 7	23. Taylor's and Laurent's series 24. Problems+ Tutorials 25. Singularities, Residues. 26. Problems+tutorials	Chalk and Talk
8.	Week 8	27. Cauchy's residue Theorem. 28. Problems 29. Contour Integration. 30. Problems.	
9.	Week 9	31. Grad, Div, Curl, Directional Derivative 32. Tangent plane, normal to surfaces. 33. Angle between surfaces, Solenoidal, irrotational fields. 34. Problems +Tutorials.	
10.	Week 10	35. Line, Surface, 36. Volume integrals. 37. Green's Theorem, 38. Stokes' Theorem	
11.	Week 11	39. Gauss Divergence Theorem 40. Problems+Tutorials. 41. Vector spaces and examples of VS. 42. Subspaces and examples	

12.	Week 12	Second Assessment 43. Linear independence, linear dependence. 44. More Problems +Tutorial	
13.	Week 13	45. Span, Basis, Dimension. 46. More Examples 47. Inner Product spaces & Orthogonality Ortho normal basis + Tutorial.	

COURSE ASSESSMENT METHODS

S.No.		Week/Date	Duration	% Weightage
1.	First Assessment (Descriptive-from first two units)	6 th week	1 Hour	20%
2.	Second Assessment (Descriptive- from third and fourth units)	12 th week	1 Hour	20%
3.	Reassessment for the absentist. (Descriptive- from first four units)	13 th week	1 Hour	20%
4.	Third assessment Assignment			10%
5.	Final Assessment (Descriptive-from all the units)		3 Hours	50%

Total : 100 Marks

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

Reference Books:

1. Kreyszig, E., Advanced Engineering Mathematics, 10th edn, John Wiley Sons, 2010.
2. Grewal, B.S., Higher Engineering Mathematics, 43rd edition, Khanna Publications, Delhi.
3. Gilbert Strang, Linear Algebra and its applications, 4th edn, Cengage Learning, 2006
4. James Ward Brown and Ruel V. Churchill, Complex variables and Applications, 9th edn, McGraw-Hill, 2013, 2007.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

1. Feedback from students during class committee meeting.
2. Anonymous feedback through questionnaire (as followed previously).

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

1. Students should submit assignments before last date of submission. In case students fails to submit their assignments, he/she will get zero mark for that particular assignment.
2. Absentees of the first assessment or the second assessment can only write the reassessment test.
3. To appear the final assessment exam, students should have at least 75% of class attendance.
4. In case, the students who have 55% to 74% attendance, with the genuine reasons can be allowed to appear the final assessment exam prior to providing the proof within the stipulated time.
5. Those students who have less than 55% of class attendance are not allowed to appear the final assessment examination.
6. Failure students with more than 54% class attendance (excluding OD, medical leave) have to undergo formative assessment.
7. Students with less than 55% class attendance (excluding OD, medical leave) have to redo the course.
8. Final Assessment Absentees will have to write the Reassessment (supplementary) exam for 50 Marks.

9. Pass mark $\geq \min \left\{ \frac{\text{class average}}{2}, \frac{\text{Class maximum}}{3} \right\}$.

10. The letter grades and the corresponding grade points are as follows:


Letter	S	A	B	C	D	E,R	F,I	V	FF	X
Grade(GP)	10	9	8	7	6	5	0	-	2	-

- Students scoring less than the passing minimum marks in the assessments defined in the course plan shall be deemed to have not successfully completed the course and be given an 'F' grade.
- Students awarded F grade may REDO the course or opt for formative assessment.
- 'V' indicates lack of required attendance. Students awarded 'V' grade must compulsorily redo the course.
- 'I' grade indicates incompleteness of formative assessment.
- A student who gets an 'I' grade must necessarily convert it to a 'R' grade by completing the formative assessment.
- An 'FF' grade is awarded for not completing the formative assessment in the prescribed maximum period of study due to gross negligence. An 'FF' grade will have a grade point of 2 and it will remain on the grade card permanently. This will be used in the CGPA calculations.
- A student who earns a minimum of 5 grade points (a 'E' grade or a 'R' grade) in a course is declared to have successfully completed the course.
- If the student 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.**
- There will be one reassessment (for 90 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.**

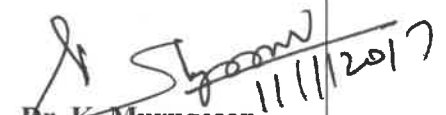
ADDITIONAL COURSE INFORMATION

Faculty is available for discussion after the class hours at the Department on the first floor of Lyceum. Room No. 214. Faculty can also be contacted over phone: 9629739258.

FOR SENATE'S CONSIDERATION


Course Faculty
Dr. A. Shanmuga Vadivu


CC-Chairperson


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