NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI- 620 015

DEPARTMENT OF MATHEMATICS

COURSE OUTLINE TEMPLATE

Course Title	Mathematics – II		
Course Code	**MAIR21**	No. of Credits : 4	
Department	**Mathematics**	Section: **CSE A & B**	
Pre-requisites Course Code		**+2 Mathematics, MAIR11-Mathematics-I**	
Course Teacher		Email Id	Telephone No.
Dr. A. Balu		**balusuriya@yahoo.co.in** **abalu@nitt.edu**	**9443841911**
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

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)
Applying all those above concepts in Engineering. Particularly, 1. Perform standard operation in finite dimensional vector spaces 2. Compute the dot product of vectors, lengths of vectors, and angles between vectors. 3. Perform gradient, div, curl operator on vector functions and give physical interpretations. 4. Use Green's , Gauss divergence and Stoke's theorems to solve engineering problems. 5. solve higher order ODEs and interpret it geometrically. 6. Compute differentiation of functions of complex variable. 7. Construct analytic function for given real or imaginary part of it. 8. find images of the given region by standard functions of complex variable. 9. compute bilinear map by knowing the images of three points.	

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
	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 + Tutorial	
	Week 2	4. Particular Integrals for Type IV, V 5. Particular Integrals for Type VI 6. Equation reducible to linear equations with constant coefficients.	Chalk and Talk
	Week 3	7. More Problems + Tutorial. 8. Vector spaces and examples of VS. 9. Subspacesand examples	
	Week4	10. Linear independence, linear dependence. 11. More Problems on linear indep & dep 12. Span, Basis, Dimension.	Chalk and Talk

	Week 5	13. More Examples 14. Inner Product spaces & Orthogonality 15. Ortho normal basis	
	Week 6	16. Gram Schmidt orthogonalization process 17. Tutorial **Assessment –I** 18. Problems on Grad, Div, Curl,	
	Week 7	19. Problems on Grad, Div, Curl, 20. Directional Derivative 21. Tangent plane, normal to surfaces. 22. Angle between surfaces, Solenoidal, irrotational fields.	
	Week 8	23. Line Integral & Problems 24. Green's Theorem+Tutorial 25. Surface &Volume Integral, Stokes' Theorem	
	Week 9	26. Stokes' Theorem 27. Gauss Divergence Theorem 28. Problems+ Tutorial	
	Week 10	29. Analytic function, C-R equation. 30. Problems on C-R equation 31. Cartesian and polar form of CR –Eqn 32. Properties and Construction of analytic function (RP given)+ Tutorial 33. Construction of analytic function (IP Given) 34. Conformal mapping	Chalk and Talk
	Week 11	35. Conformal mapping of standard elementary mappings 36. Bilinear Transformations 37. Problems+Tutorial	
	Week 12	**Assessment -II**	

Week 13	38. Cauchy's integral Theorem 39. Cauchy's integral formula +Tutorial 40. Taylor's Series 41. Laurent's series 42. Singularities, Residues. 43. Cauchy's residue Theorem+Tutorial		
Week 13	44. Contour Integration. 45. Integration involving unit circle + Tutorial		Chalk and Talk

COURSE ASSESSMENT METHODS

S.No.		Week/Date	Duration	% Weightage
1.	Assessment t –I	6th Week	1 Hour	20%
2.	Assessment-II	12th Week	1 Hour	20%
3.	Reassessment for Assessment I &II	13th Week	1.Hour	20%(Assessment I &II portions)
4.	Assessment -III (Assignment)	5th week &13th week		(5+5= 10%)
5.	FinalAssessment		3 Hours	50% Total : 100 Marks

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

Text 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

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$\geq min \left\{ \dfrac{class\ average}{2}, \dfrac{Class\ maximum}{3} \right\}$.
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	-

a. 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.

b. Students awarded F grade may REDO the course or opt for formative assessment.

c. 'V' indicates lack of required attendance. Students awarded 'V' grade must compulsorily redo the course.

d. 'I' grade indicates incompletion of formative assessment.

e. A student who gets an 'I' grade must necessarily convert it to a 'R' grade by completing the formative assessment.

f. 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.

g. 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.

h. **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.**

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.

i) No improvement test will be conducted for the Assessment I & II

ADDITIONAL COURSE INFORMATION

Faculty is available for discussion after the class hours at the Department on the first floor of Lyceum. Room No. 210. Faculty can also be contacted over phone: **9443841911.**

Course Faculty
Dr. A. Balu

CC-Chairperson 18/1/17

Dr. K. Murugesan 11/1/2017
Professor & Head
Dept. of Mathematics

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