NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI- 620 015

DEPARTMENT OF MATHEMATICS

COURSE OUTLINE			
Course Title	**Mathematics – II**		
Course Code	**MAIR 21**	No. of Credits : **4**	
Department	**Mathematics**	Section: **MECHANICAL A&B**	
Pre-requisites Course Code		**MAIR 11 - Mathematics-I**	
Course Teacher(s)/Tutor(s)		Email Id	Telephone No.
S.kalidasan		**skalikannan99@gmail.com** **skali@nitt.edu**	**7402094570**
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

To acquire basic knowledge in Linear Algebra, Differential Equation, Line, Surface, Volume integration,analytic functions, conformal mappings, bi-linear transformation, and Complex Integration.

Enhance his/her knowledge in Matrix theory through Linear Algebra to have a wider applications in Analysis and Differential Equations and solving linear differential Equations and etc.

Understanding the concepts of Line, Surface, Volume integrals as an extension of Multiple integrals and studying some important theorems and solving problems.

Studying complex valued functions and its necessary conditions for analyticity, Conformal mapping, bi-linear transformation and Complex Integration, Taylor's series, Laurent's series, Residues, Contour Integration.

COURSE OUTCOMES (CO)	
Course Outcomes	Aligned Programme Outcomes(PO)
The students are able to • 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. Vector spaces and examples of VS. 2. Subspaces and examples 3. Linear independence, linear dependence. 4. More Problems +Tutorial	Chalk and Talk
2	Week 2	5. Span, Basis, Dimension. 6. More Examples 7. Inner Product spaces & Orthogonality 8. Ortho normal basis + Tutorial.	
3	Week 3	9. Gram Schmidt orthogonalization process 10. First order differential equation and its soln 11. Higher order homogeneous Linear differential Equations and its soln. 12. Particular integrals for Type-I, II, III	

4	**Week 4**	13. Particular Integrals for Type IV, V 14. Particular Integrals for Type VI 15. Equation reducible to linear equations with constant coefficients. 16. More Problems + Tutorial.	
5	**Week 5**	17. Simultaneous Differential Equations 18. Method of Variation of Parameters 19. Applications – Electric Circuit Problems 20. Tutorial	
6	**Week 6**	21. Analytic function, C-R equation. 22. Cartesian and polar form of CR –Eqn 23. Properties and Construction of analytic function. 24. Problems +tutorials.	
	Week 7	25. Conformal mapping **First Assessment**	
7	**Week 8**	26. Conformal mapping 27. Problems 28. Bilinear Transformations 29. Problems+Tutorials.	Chalk and Talk
8	**Week 9**	30. Cauchy's integral Theorem 31. Cauchy's integral formula 32. Taylor's and Laurent's series 33. Problems+ Tutorials	
9	**Week 10**	34. Singularities, Residues. 35. Cauchy's residue Theorem. 36. Problems 37. Problems+tutorials	
10	**Week 11**	38. Contour Integration. 39. Problems. 40. Grad, Div, Curl, Directional Derivative 41. Tangent plane, normal to surfaces.	
11	**Week 12**	42. Angle between surfaces, Solenoidal, irrotational fields. 43. Problems +Tutorials. **Second Assessment**	
12	**Week 13**	44. Line, Surface, volume integrals. 45. Green's Theorem, Stokes' Theorem 46. Gauss Divergence Theorem 47. Problems+Tutorials.	

COURSE ASSESSMENT METHODS				
S.No.		**Week/Date**	**Duration**	**% Weightage**
1.	**First Assessment (Descriptive-**from first two units**)**	**7th week**	**1 Hour**	**20%**
2.	**Second Assessment (Descriptive-** from third and fourth units**)**	**12th week**	**1 Hour**	**20%**
3.	**Reassessment for the absentist. (Descriptive-**from first four units)	**13th week**	**1 Hour**	**20%**
4.	**Third assessment (objective type questions)**	**13th week**	**1 Hour**	**10%**
5.	**Final Assessment (Descriptive-**from all the units**)**		**3 Hours**	**50%**
	Total : 100 Marks			

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

Text Books

1. *Kreyszig, E., Advanced Engineering Mathematics, 9thedition, John Wiley Sons, 2006.*

2. Grewal, B.S., Higher Engineering Mathematics, 42ndedition, Khanna Publications, Delhi, 2012.

3. Gilbert Strang, Linear algebra and its applications,4th edn. Cengage Learning, 2006.

4. James Ward Brown and Ruel V. Churchill, Complex Variable 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. Absentees of the first assessment or the second assessment can only write the reassessment test.
2. To appear the final assessment exam, students should have at least 75% of class attendance.
3. In case, the students who have 65% 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.
4. Those students who have less than 65% of class attendance are not allowed to appear the final assessment examination.
5. Failure students with more than 64% class attendance (excluding OD, medical leave) have to undergo formative assessment.
6. Students with less than 65% class attendance (excluding OD, medical leave) have to redo the course.
7. 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.
8. 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.
9. The passing minimum should be $\frac{\bar{X}}{2}$ or $X_{max}/3$, whichever is less Where $\bar{X}$ is the mean of the class and X_{max} is the maximum mark in the class.

ADDITIONAL COURSE INFORMATION

Faculty is available for discussion after the class hours at the Department on the first floor of Lyceum. Room No. 215. Faculty can also be contacted over phone: 7402094570.

FOR SENATE'S CONSIDERATION

Course Faculty _____ 10/11/2015 **CC-Chairperson** _____ 18/11/17 **HOD** _____ 10/11/2017

Dr. K. Murugesan
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