Course Code				
Course Category	**Basic Sciences**			
Course Title	**Transform Technique & Vector Calculus(TTVC)**			
Total Teaching Hrs and Credits	**Lectures**	**Tutorial**	**Laboratory**	**Credits**
	30	**15**	**--**	**2+1=03**

Pre-requisites:

- LADC & IC (Mathematics in F. Y. B. Tech)

Course Objectives:

1. To understand integral transform techniques and their applications.
2. To learn vectors calculus for applications in engineering field.

Course Outcomes:

After completion of this course students will be able to

1. Solve problems related to Fourier Transforms
2. Solve problems using Z transforms
3. Apply the knowledge of vector calculus for solving engineering problems

Course Contents:

1. Fourier Transform
2. Z-Transform
3. Vector Differential Calculus
4. Vector Integral Calculus

Tutorial Exercises:

1. Fourier Sine and Cosine Transforms.
2. Finite & Discrete Fourier Transform
3. Z-Transform and Inverse Z-Transform.
4. Solution of Difference Equation
5. Vector differentiation- problems on tangential & normal component, velocity, acceleration.
6. Gradient, divergence and curl.
7. Work done, Green's Lemma
8. Stoke's and Divergence Theorem.

Two tutorials will be conducted using Mathematical Software. Tutorial shall be engaged in four batches (batch size of 15 students) per division.

Learning Resources:

Reference Books

1. KreyszigErwin,"Advanced Engineering Mathematics" ,10th edition ,Wiley Eastern Limited 2015.
2. O' Neil Peter,"Advanced Engineering Mathematics" ,8th edition ,Cengage Learning 2015.

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3. Greenberg Michael D.,"Advanced Engineering Mathematics", 2nd edition, Pearson . 2009.
4. Grewal B.S., "Higher Engineering Mathematics" ,43rd edition Khanna Publishers 2014

Supplementary Reading:

Weber H.J. and Arfken G.B. "Mathematical Methods For Physicists" , 6th edition, Academic Press 2011.

Web Resources:

http://nptel.ac.in/courses/111105035/6
http://nptel.ac.in/courses/111105090

MOOCs :

https://ocw.mit.edu/courses/mathematics/18-02sc-multivariable-calculus-fall-2010/

Pedagogy:

1. Co-teaching
2. Audio- video techniques
3. Tutorials and class tests

Assessment Scheme:

Class Continuous Assessment : 100 Marks

Assignment/ short term Question answers Tests	Tutorial	Mid Term Test	Total
20 Marks	50 Marks	30 Marks	100 Marks

Laboratory Continuous Assessment : NA

Term End Examination: 50 marks

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Syllabus: Theory

Module No.	Contents	Workload in Hrs
		Theory
1	Fourier Transform: Fourier Integral theorem, Fourier Sine and Cosine Transforms, Inverse Fourier Transform. Finite Fourier Transform, Discrete Fourier Transform.	08
2	Z-Transform: Definition, Properties, Z- transform of standard sequences and their inverse, solution of difference equations.	08
3	Vector Differential calculus: Physical interpretation of Vector differentiation, Vector differential operator, Gradient, Divergence and Curl, Directional derivative, Vector identities.	07
4	Vector integral Calculus: Line, Surface and Volume integration, Work done, Green's Lemma, Stoke's and Divergence Theorem. Applications in Engineering field(branch specific)	07

Tutorial:

Module No.	Contents	Workload in Hrs
		Tutorial
1	Fourier Sine and Cosine Transforms.	02
2	Finite & Discrete Fourier Transform	02
3	Z-Transform and Inverse Z-Transform.	02
4	Solution of Difference Equation	02
5	Vector differentiation- problems on tangential & normal component, velocity, acceleration.	02
6	Gradient, divergence and curl.	02
7	Work done, Green's Lemma	02
8	Stoke's and Divergence Theorem.	01

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