

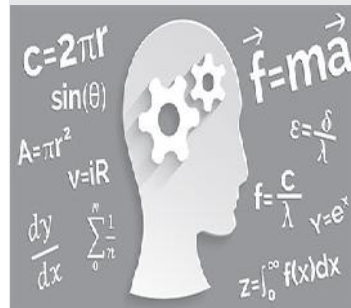
# 19HS107 ENGINEERING MATHEMATICS - II (A)

Hours Per Week :

L	T	P	C
2	0	2	3

Total Hours :

L	T	P	WA/RA	SSH/HS	CS	SA	S	BS
30	-	30	10	45	-	-	-	-



Source :

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## COURSE DESCRIPTION AND OBJECTIVES:

To understand the concept of complex geometry which is very useful in constructing machines. Complex analysis has a great role in many circuits. To understand about Fourier series which represents periodic functions. It is used in the resolution of partial differential equations, which appears in many engineering problems such as heat diffusion, wave propagation and fluid mechanics problem.

## COURSE OUTCOMES:

Upon completion of the course, student will able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Understand the concept of gradient, divergence and curl.	---
2	Analyse consistency of a system linear equations.	2
3	Apply double integrals and triple integrals.	1,3
4	Evaluate cartesian and polar coordinates to find area.	4
5	Apply row operations to reduce a matrix to echelon form, normal form.	3
6	Creative vector integral theorems in finding surface and volume integrals.	5,9

## SKILLS:

- ✓ Apply various methods to find finite difference.
- ✓ Solve given system of ordinary differential equation.
- ✓ Compute numerical differentiation and integration.
- ✓ Compute euler's method, taylor's series, runga-kutta method.
- ✓ Evaluate Multiple integrals, fourier's sine and cosine series.

<b>UNIT - I</b>	<b>L-06</b>
Numerical Analysis-I : Interpolation Finite difference, various difference operators and their relationships. interpolation with equal intervals. Newton's forward and backward interpolation formulae. Interpolation with unequal intervals. Newton's divided difference formula. Lagrange's interpolation formula.	
<b>UNIT - II</b>	<b>L-06</b>
Numerical Analysis II, Numerical differentiation, Numerical integrations.	
<b>UNIT - III</b>	<b>L-06</b>
Ordinary differential equations: Exact and Bernoulli's differential equations, equations reducible to exact form by integrating factors, equations of first order and higher degree, Clairaut's equation, Differential equations of higher orders, methods of finding complementary functions and particular integrals.	
<b>UNIT - IV</b>	<b>L-06</b>
Numerical Analysis III, Numerical solutions of ordinary differential equations by Picard's, Taylor's series. Euler's and modified Euler's methods. Runge-Kutta method.	
<b>UNIT - V</b>	<b>L-06</b>
Fourier series Infinite series and its convergence (Not for testing) Definition of periodic functions Fourier series, Euler's formulae, Dirichlet's conditions, functions having arbitrary period, even and odd functions, half range series, Fourier Sine and Cosine Series, Fourier series for function having period $2L$ .	

## LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS	TOTAL HOURS-30
1. Differentiation.	
2. Integration.	
3. Numerical integration – Trapezoidal rule.	
4. Numerical integration – Simpson's 1/3 rule.	
5. Numerical integration – Boole, Weddel rules.	
6. Solution of ordinary differential equations of first order.	
7. Solution of ordinary differential equations of higher order.	
8. Numerical solution of ordinary differential equations - Euler method.	
9. numerical solution of ordinary differential equations – RK method.	
10. (Lagrange's) Interpolation.	
11. Fourier series.	
12. Function having point of discontinuity change of intervals.	
13. Forier integrals.	
14. singularities and Zeros.	
15. Practical examination.	

### TEXT BOOKS:

1. H. K. Dass and Er. Rajanish Verma, 2015, "Higher Engineering Mathematics", S. Chand & Co., Third revised edition.
2. B. S. Grewal, 2018, "Higher Engineering Mathematics", Khanna Publishers, 44 Edition.

### REFERENCE BOOKS:

1. John Bird, 2018, "Higher Engineering Mathematics", Routledge (Taylor & Francis Group), London, New York.
2. Srimanta Pal, Subodh C. Bhunia, 2015, "Engineering Mathematics", Oxford Publications.
3. B. V. Ramana, "Advanced Engineering Mathematics", TMH Publishers.
4. N. P. Bali, K. L. Sai Prasad, 2018, "A Textbook of Engineering Mathematics I, II, III," Universal Science Press, New Delhi.
5. T. K.V. Iyengar 2018, "Engineering Mathematics, I, II, III", S. Chand & Co., New Delhi.
6. Narayan Shanti. 2004, "Differential Calculus". S. Chand and Co. Ltd. New Delhi.