

APPLIED MATHEMATICS III				
CLASS S.E. ( INFORMATION TECHNOLOGY)				
SEMESTER III				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	01	
	PRACTICALS	:		
			<b>HOURS</b>	<b>MARKS</b>
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		-	-
	ORAL		-	--
	TERM WORK		-	25

### 1. Complex Variables:

? Functions of complex variables: Continuity and derivability of a function, Analytic functions, Necessary condition for  $f(z)$  to be analytic, sufficient conditions (without proof); Cauchy-Riemann equations in polar form, Harmonic functions, Orthogonal trajectories; Analytical and Milne-Thomson method to find  $f(z)$  from its real or imaginary parts.

? Complex Integration, Taylor's and Laurent's series (without proof), Cauchy's residue theorem(statement & application)

### 2. Fourier Series:

? Orthogonal and orthonormal functions, Sine and cosine function and their orthogonal properties, Expression for a function in a series of orthogonal functions

? Fourier series, Dirichlet's conditions, Fourier series of periodic function, Even and Odd functions, Half range sine and cosine series, Parseval's relations.

### 3. Laplace Transform:

? Laplace Transform of constant, trigonometric, exponential functions,

shifting properties, Expressions (with proofs) for i)  $L\{t^n f(t)\}$  ii)  $L\{f(t)/t\}$  iii)  $L\{f(u)du\}$  iv)

Heaviside unit step functions, Dirac delta functions and their Laplace transforms,

Laplace transform of periodic function.

? Evaluation of inverse Laplace transforms, Partial fraction method, Convolution theorem.

? Application to solve initial and boundary value problems involving ordinary differential equation with one dependent variable.

#### **4. Matrices:**

? Types of matrices, Adjoint of a matrix , Elementary transformations of

a matrix, Inverse of a Matrix using Elementary transformations , Reduction to normal form.,rank using normal form Systems of homogeneous and non homogeneous equations , their consistency and solution.

#### **5. Scilab**

? Introduction to Scilab: Mathematical Functions, Tools, Arrays & their applications.

?QUESTION ON SCILAB SHOULD NOT BE ASKED IN UNIVERSITY (THEORY) EXAMINATION.

TEXT BOOKS:

1. P.N.Wartikar and J.N.Wartikar, "Elements of Applied Mathematics"

Volume 1 and 2 , A.V.Griha,Pune

2. S.S.Shastri, "Engineering Mathematics" Vol-2, PHI, 2nd Edition, 1994.

3. Churchil, "Complex Variable",McGraw Hill, Tokyo.

REFERENCES:

1. Shantinarayan, "Matrices",S.Chand Publication House , Delhi

2. Shantinarayan , "Theory of function of Complex Variable", S.Chand Publication House , Delhi

3. Schaum's Outline Series, McGraw Hill, "Laplace Transforms"
4. T.Veerarajan, "Engineering Mathematics", TMH
5. Dr.B.S.Gawal, "Higher Engineering Mathematics", Khanna Publications
6. Erwin Kreyszing, "Advanced Engineering Mathematics", Wiley India, 8<sup>th</sup> Edition

### **Books on SCILAB**

- 1) Engineering and scientific computing with SCILAB  
By Claude Gomez  
ISBN 978-0-8176-4009-5  
A Birkhauser Book  
Also available at Kindle Edition  
Amazon.com
- 2) Modeling and Simulation in SCILAB/ SCICOS  
By Stephen Campbell, Jean- Philippe Chancelier and Ramine Nikoukhah
- 3) SCILAB – A hands on introduction  
By Satish Annigeni  
E-book downloadable from [www.lulu.com/items/volume-34/419000](http://www.lulu.com/items/volume-34/419000)

#### TERM WORK:

	Marks
1. Attendance (Theory and Practical)	05
2. Assignments & practical using MATLAB/scilab	10
3. Test (at least one)	10

The final certification and acceptance of TW ensures the satisfactory performance of Term Work and Minimum Passing in the TW.

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