



Topics	Lectures	Week
Introduction	1	1 - 5
Complex algebra, Complex analytic functions, Cauchy Riemann equations, Conformal mappings, Complex potentials, Applications of conformal mappings	6	
Complex integration, Cauchy integral theorem and formula	3	
Power series, Laurent series, Residues, Residue theorem, Singularities, Poles, Classification of poles and singularities	3	
<b>OHT – 1</b>		<b>6</b>
Real definite integrals using contour integration	3	7 – 11
Periodic functions, Fourier series of functions of a general period, Existence	2	
Even and odd functions, Periodic extensions of functions, Fourier sine and cosine series, Half range expansions	2	
Complex Fourier series, Fourier integral representation, Fourier sine and cosine integrals	3	
Fourier transforms, Properties, Convolution in time and frequency domain, Fourier sine and cosine transform	2	
<b>OHT – 2</b>		<b>12</b>
Partial differential equations (PDEs), D' Alembert Solution	3	13 – 17
Separation of variables technique, initial & boundary value problems	3	
Derivations of Wave, Heat & Laplace equations, Solutions by Fourier series	3	
Laplace equation in cylindrical & spherical coordinates, Solution of PDEs by Laplace transforms	3	
Transmission line equation & Transport equation, Fluid flow and complex potential of a flow	2	
<b>ESE</b>		<b>18</b>
<b>Total</b>	<b>39</b>	



**Books:**

**Text Books:**

- Advanced Engineering Mathematics (9<sup>th</sup> Edition) by Ervin Kreyszig
- Applied Complex Variables for Scientists and Engineers by Yue Kuen Kwok

**Reference Books:**

- Real and Complex Analysis by Walter Rudin.
- Complex Variables & Applications by James Ward Brown, Ruel V.Churchill.
- Advanced Engineering Mathematics by Peter V. O'Neil.
- Advanced Modern Engineering Mathematics by Glyn James.