



Complex Numbers and functions: Complex Numbers; Geometric Representation of Imaginary numbers; Roots of a complex number; Complex function; Real and imaginary parts



BAPATLA ENGINEERING COLLEGE::BAPATLA (Autonomous)

of circular and hyperbolic functions;

Calculus of complex functions: Introduction; Limit of a complex function; Derivative of $f(z)$; Analytic functions; Harmonic functions; Complex integration; Cauchy's theorem; Cauchy's integral formula.

[Sections: 19.1; 19.2; 19.5; 19.7; 19.12; 20.1; 20.2; 20.3; 20.4; 20.5; 20.12; 20.13; 20.14]

UNIT-II

Calculus of complex functions : Series of complex terms; Taylor series; Laurent's series; Zeros of an analytic function; Singularities of an analytic function; Residues; Residue theorem; Calculation of residues; Evaluation of real definite integrals: Evaluation around the unit circle, Evaluation around a small semi-circle.

[Sections: 20.16.1; 20.16.2; 20.16.3; 20.17.1; 20.17.2; 20.18.1; 20.18.2; 20.19; 20.20]

UNIT-III

Fourier transforms: Introduction; Definition; Fourier integral theorem (without proof); Fourier sine and cosine integrals; Complex form of Fourier integrals; Fourier integral representation of a function; Fourier transforms ; Properties of Fourier transforms; Convolution theorem(without proof); Fourier transforms of the derivative of a function.

[Sections: 22.1; 22.2; 22.3.1; 22.3.3; 22.3.4; 22.4; 22.5; 22.6.2; 22.9] .

UNIT-IV

Series Solution of Differential Equations and Special Functions: Introduction; Validity of series solution; Series solution when $x = 0$ is ordinary point of the equation; Frobenius method; Bessel's function; recurrence formula for $J_n(x)$; expansions for J_0 and J_1 ; value of $J_{1/2}$; generating function for $J_n(x)$; Orthogonality of Bessel functions.

[Sections: 16.1; 16.2; 16.3; 16.4; 16.5; 16.6; 16.7; 16.8; 16.9; 16.11]

Text Books :	B.S.Grewal, "Higher Engineering Mathematics", 44 th edition, Khanna publishers, 2017.
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References :	[1].Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons. [2].P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.
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