Department of Mathematics and Statistics

MSO202A Complex Variables 3-1-0-0 [6]

Course objective

The aim of the course is to provide an introduction to the fundamental concepts of complex variables such as analyticity, complex integrals and singularity. The course equips the students with necessary skills to enable them handle problems involving complex numbers.

Course Contents

Lecture-wise break-up:

Topics	No. of lectures
Complex numbers, polar form, De Moivre's formula, convergent sequence, Continuity, Complex Differentiation.	2
Complex Differentiation and Cauchy-Riemann equation, Applications of C-R equations.	2
Analytic functions and Power series.	2
Derivative of a power series, Exponential function.	1
Logarithmic function and trigonometric functions.	1
Contour and Contour integral, Anti-derivative.	1
ML inequality, Cauchy's Theorem,	1
Cauchy integral formula, Examples: evolution of contour integrals, Derivatives of analytic functions.	1
Cauchy's estimate, Liouville's Theorem, Fundamental Theorem, of Algebra, Morera's Theorem, (without Proof), Taylor's Theorem.	1
Examples: Computation of Taylor's series, Zeros of Analytic functions, Identity theorem, Uniqueness theorem, Applications.	1
Identity theorem, theorem, Application, Maximum modulus principle, Laurent series.	1
Computation of Laurent expansion, Cauchy residue theorem.	1
Poles, Residue at a pole, Examples.	1
Residue at a pole and Examples (cond.), Evaluation of real improper integrals.	1

Evaluation of real improper integrals of different forms.	2
Linear fractional transformations.	1
TOTAL	**20**

Instructor: S Ghorai email: sghorai@iitk.ac.in

Classroom: L4

TIME: LEC: MWF 08:00-10:00 L4;T/D: Th 08:00-10:00

Course Organization:

All Notices for the course will be sent by email to the course email MSO202A@iitk.ac.in. Assignment materials will be posted in http://home.iitk.ac.in/~sghorai/TEACHING/MSO202/mso202.html

Exams and quizzes: There will be a quiz and an end-semester examinations.

Grading policy: Quiz-25, End semester-65, Attendance-10 * (No. of lecture classes attended/Total no. of lecture classes) [rounded to nearest integer]

Appearance in the end-semester examination is mandatory.

References:

Text book: Advance Engineering Mathematics, E. Kreyszig

Reference Book: Complex Variables and Applications, R.V. Churchill and J.W. Brown