

DEPARTMENT OF MATHEMATICS
CENTRAL UNIVERSITY OF JAMMU

TEACHING PLAN	
Course Title: Complex Analysis	Duration of Examination: 3 hours
Course Code: PGAMT2C003T	Maximum Marks: 100
Course Instructor: Dr. Deep Singh	
Lecture 1	Review of complex numbers, stereographic projection
Lecture 2	Chordal distance, multi-valued functions
Tutorial	Assignment/discussion/exercises
Lecture 3	Branches of multi-valued functions with special reference to $\arg z$
Lecture 4	Exponential functions, logarithm function, power functions and phase factors
Tutorial	Assignment/discussion/exercises
Lecture 5	Analytic functions: Limit and continuity of complex functions
Lecture 6	Complex derivative, singularities, Cauchy-Riemann equations
Tutorial	Assignment/discussion/exercises
Lecture 7	Cauchy-Riemann equations in polar form
Lecture 8	Harmonic functions and harmonic conjugate
Tutorial	Assignment/discussion/exercises
Lecture 9	Line integrals, piecewise smooth path
Lecture 10	Jordan curve and Green's theorem
Tutorial	Assignment/discussion/exercises
Lecture 11	Independence of path, anti-derivative
Lecture 12	Fundamental theorem of algebra
Tutorial	Assignment/discussion/exercises
Lecture 13	Mean value property
Lecture 14	topic contd.
Tutorial	Assignment/discussion/exercises
Lecture 15	Strict maximum principal (real and complex version)
Lecture 16	ML-estimate
Tutorial	Assignment/discussion/exercises
Lecture 17	Complex integration and analyticity
Lecture 18	Cauchy's theorem
Tutorial	Assignment/discussion/exercises
Lecture 19	Cauchy integral formula
Lecture 20	Cauchy integral formula for higher order derivatives
Tutorial	Assignment/discussion/exercises
Lecture 21	Liouville's theorem
Lecture 22	Cauchy's inequality
Tutorial	Assignment/discussion/exercises
Lecture 23	Morera's theorem, Goursat's theorem
Lecture 24	Complex form of cauchy-Riemann equations
Tutorial	Assignment/discussion/exercises
Lecture 25	Power series and examples
Lecture 26	Radius of convergence and examples
Tutorial	Assignment/discussion/exercises
Lecture 27	Power series expansion of an analytic function

Lecture 28	Taylor's expansion and isolated singularities
Tutorial	Assignment/discussion/exercises
Lecture 29	Laurent series
Lecture 30	Residue calculus, Cauchy residue theorem
Tutorial	Assignment/discussion/exercises
Lecture 31	Fractional residue, Jordan's lemma
Lecture 32	Evaluation of integrals using residue theorem
Tutorial	Assignment/discussion/exercises
Lecture 33	Conformal mapping, Möbius transformations
Lecture 34	composition of two Möbius transformations
Tutorial	Assignment/discussion/exercises
Lecture 35	Translation, dilation, inversion and examples
Lecture 36	Schwarz lemma
Tutorial	Assignment/discussion/exercises
Lecture 37	Conformal self-maps of the unit disk
Lecture 38	Mapping of unit disk and upper half plane
Tutorial	Assignment/discussion/exercises
Lecture 39	The Riemann mapping theorem
Lecture 40	topic continued
Tutorial	Assignment/discussion/exercises