

**MTH 332/532 COMPLEX VARIABLES  
SYLLABUS**

**TEXTBOOK:** Complex Analysis for Mathematics and Engineering, 4th Edition, by John H. Mathews and Russell W. Howell, Jones and Bartlett, Publisher. Any problem requiring a curve or domain must have a neat graph of the curve and/or domain as part of the problem.

<b>Contact Hours</b>	<b>Section</b>	<b>Title</b>	<b>Problems</b>
3	1.2	The Algebra of Complex Numbers (Binomial Theorem)	1f, 1g, 1i, 2d, 2e, 3, 4 (12), 9
	1.3	The Geometry of Complex Numbers	2c, 3d, 5, 6, 8, 11, 13, 20
	1.4	The Geometry of Complex Numbers, cont.	1d, 1f, 1g, 2, 3d, 3h, 5, 7, 9, 11
	1.5	The Algebra of Complex Numbers, Revisited	1b, 2, 3, 5a, 5e, 7, 8, 11a 13
	1.6	The Topology of Complex Numbers	1b, 1d, 2a, 3c, 5b, 6, 7, 9, 10, 11, 12, 13
4	2.1	Functions of a Complex Variable	1, 2, 6, 9, 10d, 11e, 13d
	2.4	Limits and continuity	1b, 1e, 2, 3, 6, 14
	3.1	Differentiable and Analytic Functions	1, 2, 3, 5, 6, 10, 11
	3.2	The Cauchy-Riemann Equations	1c, 5, 7, 8, 10, 11, 12, 13, 15
	3.3	Harmonic Functions	1, 2, 4, 5a, 5c, 7, 9, 11
8	9.1	Basic Properties of Conformal Mapping	1, 2(1+i), 3(1+i), 4(3+4i), 6
	2.2	Transformations and Linear Mappings	1, 2, 3, 6, 7 8, 10, 11
	2.3	The Mappings $z^n$ and $z^{1/n}$	5, 6, 7, 9, 12, 14, 18a
	2.6	The Reciprocal Transformation $1/z$	2, 3, 4, 5, 10, 12, 15, 17
	5.1	The complex Exponential Function	6e, 7d, 10, 13, 18
	5.2	The Complex Logarithm	1c, 1d, 1h, 3a, 3c, 7, 8, 9, 11, 12
	5.4	The Trigonometric Functions	1, 2, 6b, 6d, 6e, 7, 10a
6	6.1	Complex Integrals	1b, 1d, 1e, 2, 3
	6.2	Contours and Contour Integrals	1, 2b, 6, 8, 14, 15, 23
	6.3	The Cauchy-Goursat Theorem	1a, 1d, 2, 4, 10, 13
	6.4	The Fundamental Theorems of Integration	2, 8, 11, 13
	6.5	Integral Representation for Analytic Functions	2, 3, 4, 9, 11, 14, 17, 18
4	7.1, 7.2	Uniform Convergence and Taylor's Theorem	1, 2, 3, 4, 5, 8, 10
	7.3	Laurent Series Representation	1a, 1b, 1d, 1h, 1j, 2b, 2i, 2k,
	7.4	Singularities, Zeros, Poles	$3a(z^{-2}(z - \sin z))$ , 3b, 3e, 3f, 5, 8
2	8.1	The Residue Theorem	
	8.2	Calculation of Residues	1a, 1d, 1f, 1g, 1h, 1i, 1j, 1n, 2, 3a, 3c, 4, 5, 6, 8
	8.4	Improper Integrals of Rational Functions	1, 7, 10, 14