MATH 351 – Complex Analysis I

Department of Mathematics and Computer Sciences

Methods of Instruction	**Theor.**	**Appl.**	**Lab.**	**Intern.**	**Project/Field Work**	**Other**	**Total**	**Credit**	**ECTS Credit**
	56	-	-	-	-	-	56	(4 0 4)	7

Semester	Summer 2008
Instructor	Sezgin Sezer (A-Block, 107/A, Phone: +90 312 2844500 Ext: 307) e-mail: sezgin@cankaya.edu.tr Home Page: http://ari.cankaya.edu.tr/~sezgin
Schedule	Monday 09:40 – 11:30 B-313, Tuesday 13:40 – 15:30 B-314, Wednesday 09:40 – 11:30 B-317, Thursday 13:40 – 15:30 B-314
Office Hours	Monday 12:40 – 13:30, Thursday: 12:40 – 13:30
Prerequisite	None
Catalog Description	Algebra of complex numbers; polar coordinates and exponential form; roots of complex numbers; regions on the plane; functions; mappings and limits; continuity; derivatives; Cauchy-Riemann equations; analytic functions; harmonic functions; exponential; trigonometric and hyperbolic functions; logarithmic function and its branches; inverse hyperbolic and trigonometric functions; contour integrals; antiderivatives; Cauchy-Goursat theorem; Cauchy integral formula; fundamental theorem of algebra, maximum moduli.
Textbook	Complex Variables and Applications, Seventh Edition, R. V. Churchill, J. W. Brown, McGraw-Hill, 2003.
Reference Books	Complex Analysis for Mathematics and Engineering, Fifth Edition, J.H. Mathews, R.W. Howell, Jones and Bartlett, 2006.

Evaluation Criteria		**Number of**	**Percentages**
	Midterm Exams	2	30 + 30
	Quiz	-	-
	Homework	-	-
	Project	-	
	Term Homework	-	
	Laboratory Work	-	
	Class Participation	5	-
	Final Exam	1	40

Exam Dates	First Midterm Exam: 14 July 2008 Second Midterm Exam: 04 August 2008

Course Description Details

Week	Dates	Topics covered
1	18. 06 – 24. 06	1. Sums and Products 2. Basic Algebraic Properties 3. Further Properties 4. Moduli 5. Complex Conjugates 6. Exponential Form 7. Products and Quotients in Exponential Form 8. Roots of Complex Numbers 9. Regions in the Complex Plane
2	25. 06 – 01. 07	11. Functions of a Complex Variable 12. Mappings 13. Mappings by the Exponential Function 14. Limits 15. Theorems on Limits 16. Limits involving the point at infinity 17. Continuity 18. Derivatives 19. Differentiation Formulas 20. Cauchy-Riemann Equations 21. Sufficient Conditions for Differentiability 22. Polar Coordinates 23. Analytic Functions
3	02. 07 – 08. 07	25 Harmonic Functions 26 Uniquely Determined Analytic Functions 27 Reflection Principle 28 The Exponential Function 29 The Logarithmic Function 30 Branches and Derivatives of Logarithms 31 Some Identities Involving Logarithms 32 Complex Exponents 33 Trigonometric Functions 34 Hyperbolic Functions 35 Inverse Trigonometric and Inverse Hyperbolic Functions 36 Derivatives of Functions
4	09. 07 – 15. 07	37 Definite Integrals of Functions 38 Contours 39 Contour Integrals 40 Examples 41 Upper Bounds for Moduli of Contour Integrals Antiderivatives 42 Examples 43 Cauchy-Goursat Theorem 44 Proof of the Theorem Simply and Multiply Connected Domains
5	16. 07 – 22. 07	45 Cauchy Integral Formaula 46 Derivatives of Analytic Functions 47 Liouville's Theorem and the Fundamental Theorem of Algebra Maximum Modulus Principle
6	23. 07 – 29. 07	48 Convergence of Sequences 49 Convergence of Series 50 Taylor Series 51 Examples 52 Laurent Series 53 Examples Absolute and Uniform Convergence of Power Series
7	30. 07 – 05. 08	54 Continuity of Sums of Power Series 55 Integration and Differentiation of Power Series 56 Uniqueness of Series Representations Multiplication and Division of Power Series