MATH 592: Special Topics in Mathematics II
Real and Complex Analysis

DESCRIPTION

Real Analysis: Real functions of several real variables: limit, continuity, differentiability. Taylor's theorem. Maxima and minima. Elementary notion of integration on R^n. Change of variables in multiple integrals, Fubini's theorem. Implicit and inverse function theorems

Complex Analysis: The theory of complex analytic functions, Cauchy's integral theorem, contour integrals, Laurent expansions, the residue theorem with applications, evaluation of improper real integrals and series, conformal mappings.

TEXTBOOKS

Functions of Several Real Variables" by M. Moskowitz and F. Paliogiannis, World Scientific, Singapore, 2011
E.B. Saff, A.D. Snider, Fundamentals of Complex Analysis (3rd ed.), Pearson Ltd, 2014

SYLLABUS

Week	Dates (2019)	Sections	Topics
1	Sept 01 – 05	1.4-1.5	R^n as a metric space
2	Sept 08 – 12	2.2-2.3	Limit and continuity Linear transformations- Continuous functions over compact sets
3	Sept 15 – 19	3.1-3.3 3.4	Differentiable functions. The mean value theorem
4	Sept 22 – 26	3.5 3.6-3.7	Taylor's theorem Minima, Maxima
5	Sept 29 – Oct 03	3.8	The inverse and implicit function theorem
6	Oct 06 – 10	4.1	Integrals in R^n- Integrals over bounded sets
7	Oct 13 – 17	4.2-4.3	Properties of multiple integrals, Iterated integrals
			Major Exam
8	Oct 20- 24	Chap 1	The Complex Number System
9	Oct 27 – 31	Chap 2	Complex Functions
10	Nov 03 – 07	Chap 3	Elementary Functions

11	Nov 10 – 14	Chap 4	Complex Integration Theory
12	Nov 17 – 21		Continued.
13	Nov 24 – 28	Chap 5	Power Series- Taylor Series
14	Dec 01 – 05	Chap 5	Laurent Series
15	Dec 08 – 12	Chap 6	Residue Theory
Final Exam			