THE UNIVERSITY OF HONG KONG

Institute of Mathematical Research
Department of Mathematics

Lectures on Intermediate Complex Analysis*

Professor Ngaiming Mok
The University of Hong Kong

We study meromorphic functions on Riemann surfaces, both in the case of open Riemann surfaces such as plane domains, and in the case of compact Riemann surfaces. For compact Riemann surfaces we will study among other things elliptic functions in the case of genus 1 and Poincaré series in the case of genus ≥ 2. For plane domains and more generally Riemann domains by solving the inhomogeneous Cauchy-Riemann equation and using Runge's Theorem on approximating holomorphic functions, we establish two fundamental existence results: existence of meromorphic functions with prescribed principal parts (Mittag-Leffler's Theorem) and existence of meromorphic functions with prescribed zeros and poles (Weiestrass' Theorem). We will also study the Mittag-Leffler Problem and the Weierstrass Problem for compact Riemann surfaces of genus 1 by means of elliptic functions and related functions.

Basics on sheaf cohomology will be explained to give cohomological interpretations of both the Mittag-Leffler Problem and the Weierstrass Problem. Depending on the availability of time, further topics on compact or noncompact Riemann surfaces may be covered.

References:

1. R. Narasimhan: Complex Analysis in One Variable, Birkhäuser 2001 (2nd edition).
2. O. Forster: Lectures on Riemann Surfaces, Springer-Verlag 1981.
3. J.B. Conway: Functions of One Complex Variable I, Springer-Verlag 1995.
4. K. Chandrasekharan: Elliptic Functions, Springer-Verlag 1985.

Date / Time:	Wednesdays, September 26 – December 12, 2012, 3:00 – 5:45pm
Place:	Room 210, Run Run Shaw Bldg., HKU

**Lectures of a graduate course MATH6101 Intermediate Complex Analysis of the joint HKU-CUHK-HKUST Centre for Advanced Study (Mathematics)*

All are welcome