SF2723 Topics in Mathematics III **Spring 2019**

Introduction to Riemann Surfaces

Possible Topics for Individual Project

Below is a list of some possible topics for individual projects:

- Elliptic integrals (Section 6.1)
- Weierstrass $\wp$-function (Section 6.2)
- Theta functions (Section 6.3.1)
- Classification of compact genus 1 surfaces (Section 6.3.2)
- Euler characteristic (Section 7.1)
- The Riemann-Hurwitz formula (Section 7.2.1)
- The degree-genus formula (Section 7.2.2)
- Modular curves (Section 7.2.4)
- The Riemann-Roch formula (Section 8.2)
- The "Main Theorem" (Theorem 5 on p. 113)
- Proof of the "Main Theorem" (Chapter 9)
- The Uniformization Theorem (Chapter 10)
- Line bundles and divisors (Section 12.1.2)
- The Abel-Jacobi Theorem (Section 12.2.1)
- $\cdots$

Section numbers refer to the textbook S. Donaldson, *Riemann Surfaces*, Oxford University Press, 2011.