

Fall 2023, Pmath965: *Selected topics on Riemann surfaces*

This course will be an introduction to gauge theory of $SU(2)$ bundles over Riemann surfaces. Here are the tentative topics

- Basic theory about connections on vector bundles/principal bundles
- Nirenberg integrability theorem for complex vector bundles over Riemann surfaces
- Coulomb gauge and Uhlenbeck compactness in dimension two
- Donaldson's proof on Hitchin-Kobayashi correspondence over Riemann surfaces
- Analytic/algebraic compactification of moduli space of stable rank two bundles

Prerequisite: you are assumed to be familiar with the basic theory of Riemann surfaces and Riemannian geometry.