Syllabus

Lecture 1.

- Definitions of vector bundles and principal bundles.

- Associated bundles of principal bundles.

- Definitions of connection and curvature on vector bundles and principal bundles.

- The Chern-Weil formula.

Lecture 2.

- Classification of SU(2)–bundles on a closed oriented 4-manifold.

- The ASD (anti-self-dual) equation for SU(2)–connections on 4-manifolds.

- First examples of ASD connections.

- Gauge group action on the configuration space; the quotient space is Hausdorff and admits local slices at irreducible connections.

Lecture 3.

- Uhlenbeck's gauge fixing theorem.

- C^∞–regularity of ASD connections.

- Uhlenbeck's compactness theorem.

- Uhlenbeck's singularity removal theorem.

Lecture 4.

- Taubes' gluing theorem for ASD connections.

Lecture 5.

- Transversality and orientability of the moduli space of ASD connections.

- Donaldson's diagonalization theorem.