MA 726: SPIN GEOMETRY

SPRING 2025

Official course name: MA 726 Differential Geometry, II.

Time and location: T/Th 12:30–1:45 PM in CGS 323.

Summary. The main topics for this class are as follows:

- Clifford algebras, spin groups.
- Spin structures in geometry.
- Dirac operators on spinor bundles.
- Characteristic classes and index theorems.
- Special topics (time permitting): Holonomy (Berger classification), Killing spinors, pure spinors, twistor theory.

Prerequisites. Students are assumed to be familiar with the theory of smooth manifolds at the level of MA 721 or equivalent. Please contact me if you have any questions.

Textbook and course material. For some of the course we will follow the textbook *Spin Geometry* by Blaine Lawson and Marie–Louise Michelsohn. I will also provide my own supplemental lecture notes, which will be made available on the course website.

https://brianrwilliams.github.io/ma726/index.html

Assessment. Your grade will be determined by a two-hour final exam worth 100% of your grade. Problems on the final exam will be taken from the **four** *problem sheets* consisting of problems pertaining to course material that I will post on the course website. I will post the first example sheet by the first or second week of class. It is possible that problem sheets may be modified after being originally posted, so please stay up-to-date with the course website. I will not collect or grade any work from your solutions to problems on the problem sheet, but you are expected to solve these problems as the course progresses in preparation for your final exam.