

June 13, 2022  
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## Advanced Topics in Geometry F (MTH.B502)

### Course Syllabus

#### Important Pointers:

- <http://www.math.titech.ac.jp/~kotaro/class/2022/geom-f> (official web)
- <http://www.official.kotaro.com/class/2022/geom-f> (a mirror)
- <https://t2schola.titech.ac.jp/> (T2SCHOLA)

**Lecture:** Tuesdays 10:45–12:25, Online lecture via zoom

**Lecturer:** Kotaro Yamada (Dept. Math.); kotaro@math.titech.ac.jp

**Course Description:** A local theory of Riemannian manifolds and fundamental theorem of surface theory for surface in Riemannian 3-manifolds of constant sectional curvature are introduced. As an application, a relationship of surfaces of constant mean curvature surface in different spaces, e.g. minimal surfaces in Euclidean 3-space and constant curvature one surfaces in hyperbolic space, is discussed.

**Student learning outcomes:** Students will learn: a local theory of Riemannian manifolds, i.e. notions of Riemannian metrics, sectional curvatures; spaces of constant curvature (space forms); an extension of the fundamental theorem of surface theory for surfaces in 3-dimensional space forms.

**Textbooks:** No textbook is set. Lecture note will be uploaded on T2SCHOLA within the previous day of each class.

#### Grading Policy:

- Graded by weekly homeworks.
- Each homework consists of (1) a problem on the topics in the lecture (up to 2 points), and (2) to present a question on the contents of the lecture, or to point out error(s) in the lecture note/the lecture (up to 3 points).
- Each homework should be submitted to T2SCHOLA by 10:00 on the following Thursday of the lecture, as an pdf file in the format of the *homework sheet* (which can be downloaded from the folder “Homework Sheet” on T2SCHOLA). *Japanese is acceptable.*
- Questions, requests and comments (and the answers, lecturer’s comments) will be disclosed on the following class.