

Course Outline for MATH 4480, Advanced Seminar in Mathematics

MATH 4480 Advanced Seminar in Mathematics (1 unit)

Prerequisite: MATH 306 or [MATH 3152](#); and consent of instructor.

Exploration of advanced topics and problems in mathematics through reading, writing and oral presentations. The Class Schedule will list subtitle selected. Credit/No Credit grading only.

Repeatable up to 4 units. 1 seminar. Formerly MATH 474.

Course Learning Objectives

1	Read and analyze proofs in advanced fields of mathematics.
2	Present material in advanced fields of mathematics in written or oral form.
3	Integrate and synthesize knowledge from mathematics to interpret advanced topics in mathematics.

Expanded Course Content

Textbooks, materials, and/or other resources

Textbook will vary by topic. This sample expanded course content is based on “Differential geometry of curves and surfaces” by Do Carmo.

Week	Readings	Topics of Discussion
1	DoCarmo: Sections 1.1, 1.2, 2.1, 2.2	Introduction to curves and surfaces
2	Sections 2.4, 2.5	The tangent plane; differential of a map
3	Sections 2.5, 2.6	The first fundamental form; orientable surfaces
4	Sections 3.1 - 3.3	The Gauss map
5	Section 3.4	Vector fields on surfaces
6	Section 3.5	Ruled surfaces; minimal surfaces
7	Sections 4.1 - 4.2	Intrinsic geometry; conformal maps
8	Section 4.3	Gauss' Theorem

Week	Readings	Topics of Discussion
9	Section 4.4	Geodesics
10	Section 4.5	Gauss-Bonnet Theorem
11	Section 5.2	Rigidity of the sphere
12	Section 5.3	Complete surfaces
13	Section 5.4	First and second variations of arc length; Bonnet's theorem
14	Section 5.6	Covering spaces
15	Section 5.6	Hadamard's theorems

Method of Assessment

The Credit/No Credit grading will be based on participation. The class will work through material on an advanced topic in mathematics. Each student will be required to give at least one lecture during the semester.

Instructional Mode

The instructional mode for this class is face-to-face. This designation means that the essential academic standards of the course require in-class student engagement, and thus remote instruction is not appropriate.