MTH 743 - Fall 2018
SYLLABUS

Contact information

Cagatay Kutluhan

E-mail: kutluhan@buffalo.edu

Office: Math 117

Office hours: TR 3:30 - 4:30 pm, or by appointment

Lectures

Time: TR 9:30 - 10:50

Place: Math 235

Course description: The goal of this course is to introduce the audience to symplectic geometry. The origin of symplectic geometry lies in the study of classical mechanics where the evolution of a classical mechanical system can be described in terms of a collection of equations arising from the natural symplectic structure on its phase space with position and momentum regarded as coordinates. Since the introduction of pseudoholomorphic curves in Gromov's groundbreaking work [3], investigation of moduli spaces of pseudoholomorphic curves has occupied a significant portion of the research in symplectic geometry, which led to the introduction of Gromov-Witten invariants and Floer homology. Today, with its connections to algebraic geometry and string theory, symplectic geometry continues to be a prominent research area.

The bulk of the course will focus on building the background in symplectic geometry following [2] and [5]. In the remaining time, we will make an introduction to pseudoholomorphic curves in symplectic geometry following [1] and [4].

Prerequisities: Background in differential topology; specifically, MTH 627 or equivalent.

Grading: This will be an IBL (Inquiry Based Learning) style course. That means students will be expected to get actively involved in the learning process. Near the end of the semester, students may be asked to make presentations in class on some papers.

REFERENCES

1. Holomorphic curves in symplectic geometry. Edited by Michle Audin and Jacques Lafontaine. Progress in Mathematics, 117. Birkhuser Verlag, Basel, 1994. xii+328 pp.
2. Cannas da Silva, Ana Lectures on symplectic geometry. Lecture Notes in Mathematics, 1764. Springer-Verlag, Berlin, 2001. xii+217 pp.
3. Gromov, M. Pseudo holomorphic curves in symplectic manifolds. Invent. Math. 82 (1985), no. 2, 307?347.
4. McDuff, Dusa; Salamon, Dietmar, J -holomorphic curves and symplectic topology. Second edition. American Mathematical Society Colloquium Publications, 52. American Mathematical Society, Providence, RI, 2012. xiv+726 pp.
5. McDuff, Dusa; Salamon, Dietmar, Introduction to symplectic topology. Third edition. Oxford Graduate Texts in Mathematics. Oxford University Press, Oxford, 2017. xi+623 pp.