

MATH 584 - Singularity Theory (SELECTED TOPICS IN ALGEBRA AND TOPOLOGY)

Semester: Spring 2024

Instructors: Ferit Öztürk; *office: TB260-B, phone: 6532; ferit.ozturk@boun*

Exams & Grading: Single final exam (30 %)
7 homework assignments (70 %)

Course Schedule: TB130 Tue 9:00-11:00, Th 10:00-11:00

Course web page: <https://feritozturk.github.io/here/s24m584.html>

Textbooks: J.W. Milnor *Singular points of complex hypersurfaces*,
Princeton University Press, 1968.
E. Brieskorn, H. Knörrer *Plane algebraic curves*,
Modern Birkhäuser Classics, 2012.
C.T.C. Wall *Singular points of plane curves*,
Cambridge University Press, 2004.

Sources: J.W. Milnor *Topology from the differentiable viewpoint*,
Princeton University Press, 1965.
V. Guillemin, A. Pollack *Differential topology*,
AMS Chelsea Publishing, 1974.
V.I. Arnold, S.M. Gusein-Zade, A.N. Varchenko *Singularities of Differentiable Maps I*,
Monographs in Mathematics Birkhäuser, 1985.
F. Kirwan *Complex Algebraic Curves*,
London Mathematical Society Student Texts, 1992.
M. Reid *Undergraduate Algebraic Geometry*,
London Mathematical Society Student Texts, 2001.

Course Content: (Order may change) Differentiable maps, Implicit Function Theorem, Manifolds in \mathbb{R}^n ; Singularities; Sard's theorem; Algebraic varieties, Zariski topology, Nullstellensatz; Plane curves, Puiseux' theorems, Newton polygon; Branches, Multiplicities, Tangents; Resolution of singularities; Simple singularities; Milnor fibration, Topology of fibers.

Prerequisite: This course is intended to be accessible for all graduate students and very advanced undergraduates. The aim is to acquire general knowledge on a track of contemporary geometry and topology. No official prerequisites. Please negotiate with me if you plan to take the course.