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 15:00-17:00, Th 16:00-17:00

Course web page: `https://feritozturk.github.io/here/m584.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 comtemporary
geometry and topology. No official prerequisites. Please negotiate with me if you
plan to take the course.