אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics

2016–17–B term

Course Name Dffierential Geometry

Course Number 201.1.0051

Course web page
`https://www.math.bgu.ac.il//en/teaching/spring2017/courses/differential-geometry`

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Office Hours `https://www.math.bgu.ac.il/en/teaching/hours`

Abstract

Requirements and grading[1]

Course topics

.1 Geometry of Curves. Parametrizations, arc length, curvature, torsion, Frenet equations, global properties of curves in the plane.

.2 Extrinsic Geometry of Surfaces. Parametrizations, tangent plane, dffierentials, first and second fundamental forms, curves in surfaces, normal and geodesic curvature of curves.

.3 Dffierential equations without coordinates. Vector and line fields and flows, frame fields, Frobenius theorem. Geometry of fixed point and singular points in ODEs.

.4 Intrinsic and Extrinsic Geometry of Surfaces. Frames and frame fields, covariant derivatives and connections, Riemannian metric, Gaussian curvature, Fundamental Forms and the equations of Gauss and Codazzi-Mainardi.

.5 Geometry of geodesics. Exponential map, geodesic polar coordinates, properties of geodesics, Jacobi fields, convex neighborhoods.

[1] Information may change during the first two weeks of the term. Please consult the webpage for updates

.6 Global results about surfaces. The Gauss-Bonnet Theorem, Hopf-Rinow theorem, Hopf-Poincaret theorem.