MATH 346 – DIFFERENTIAL GEOMETRY II

Semester: Spring 2011
Instructor: Alex Degtyarev
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Exams & Grading: 2 Midterms
• 1st Midterm (%25) ~ 5th week
• 2nd Midterm (%25) ~ 10th week
Final exam (%40)
• Final Exam Finals week
Homeworks (%10)
75% attendance is obligatory

Course Schedule: Monday 9:40–10:30 am Room SAZ 04
Wednesday 10:40–12:30 pm Room SAZ 04
Office Hours: Wednesday 9:40–10:30 am
Thursday 10:40–11:30 pm

Textbook: Manfredo P. do Carmo, Differential Geometry of Curves and Surfaces,
(Prentice-Hall, New Jersey, 1976)
Supplementary: Luther Pfahler Eisenhart, A Treatise on the Differential Geometry of
Curves and Surfaces, (Dover publications, New York, 1960)

Tentative course contents

• Intrinsic geometry of surfaces (continued):
  – review of Math 345;
  – the Gauss-Bonnet theorem;
  – the exponential map;
  – shortest geodesics.

• Global differential geometry of surfaces:
  – rigidity of the sphere;
  – completeness vs. geodesic completeness;
  – the Bonnet theorem (compactness of surfaces of positive curvature);
  – Jacobi fields and conjugate points; Jacobi’s theorem;
  – Hadamard theorem (on surfaces of negative curvature);
  – surfaces of zero Gaussian curvature;
  – abstract surfaces;
  – Hilbert’s theorem on the hyperbolic plane;
  – ...

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