Syllabus

I. Course Name: Classical Problems of Geometry

II. Course description and objective

The course covers a variable serie of topics from the classical theory of curves and surfaces. Particularly, the course is aimed to develop skills and abilities of students for performimg individual and collective mathematical researches.

III. Elective

IV. Bachelor Program, 3th Term, 64 Hours, 4 Credits

V. Typical course content

1. Polyhedra, combinatorial and metric properties. Convex polyhedra and Euler formula.
2. Bendings and infinitesimal bendings of polyhedra. Cauchy theorem and rigidity of convex polyhedra. Gluck theorem.
3. Flexible polyhedra. Bellows conjecture and Sabitov theorem.
4. Linear bendings and model flexibility of polyhedra.
5. Geodesics on polyhedra.
6. Minkowski problem for polyhedra.
7. Isoperimetric problem.
8. Mylar balloons.
9. Integral inequalities for curvatures of curves (Fenchel-Borsuk, Fary-Milnor).

VI. Pre-taken courses

Differential Geometry, Mathematical Analysis

VII. Form of the final test

Examination (two-level evaluation scale)

VIII. Teaching materials and reference books

1. Alexandrov A.D., *Convex Polyhedra.* Springer, 2005.
2. Pogorelov A.V., *The multi-dimensional Minkowski problem.* V.H. Winston, 1978.
3. Berge M., *A panoramic view of Riemannian Geometry.* Springer, 2003.
4. Schneider R., Convex bodies: the Brunn-Minkowski theorem. Cambridge, CUP, 2013.
5. Santalo L., *Integral geometry and geometric probability*. Cambridge, CUP, 2004.
6. Aminov Y.A., *Differential geometry and topology of curves*. CRC Press, 2003.

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