SYLLABUS

SUBJECT: LINEAR ALGEBRA WITH ANALYTICAL GEOMETRY

TEACHER: Prof. STANISŁAW MIDURA, PhD, DSc

COURSE DESCRIPTION:
The purpose of this course is to develop the ability to use the basic methods of linear algebra and analytical geometry.

LECTURE:
Relations and transformations, properties of relations, relations of equivalence, classes of abstractions, the agreement of equivalence relation with operation, congruence relation modulo *n* and its properties. Examples of internal operations, properties of operations, groups, abel groups, subgroups, homomorphism and isomorphism of groups. **Rings**, rings of polynominals, roots of polynominals. Z_n rings, modular equations, modular rising to a power. **Matrixes.** Transpose of matrix, matrix determinant, the Sarrus rule, Laplace expansion, inverse matrix, the row of matrix. **Systems of linear equations**, the Cramer formulas, Kronnecker-Capello theorem, Gauss method. **Analytical geometry on the surface**. Vectors, scalar product, mutual positions of lines, the distance between a point and a line. **Analytical geometry in the space.** Vector, scalar and vector products, mutual positions of surfaces, lines and a surface and a line. The distance between a point and a surface.

CLASSES:
Practical exercises concern the realization of the basic notions from lectures.

LEARNING OUTCOMES:
Students will receive a basic knowledge about linear algebra and analytical geometry.

GRADING POLICY:
LECTURE: Written test.
CLASSES: Two written tests and short questions before classes.

TIMETABLE:
Number of hours:
LECTURES: 2h x 15 weeks = 30 hours (1 semester)
CLASSES: 2h x 15 weeks = 30 hours (1 semester)

TEXTBOOK AND REQUIRED MATERIALS:

1. J. Klukowski, I. Nabiałek, Algebra dla studentów, WNT, Warszawa, 2004.
2. J. Gancarzewicz, Algebra liniowa z elementami geometrii, Wydawnictwo Uniwersytetu Jagiellońskiego, Kraków, 1999.
3. R. Leitner, Zarys matematyki wyższej, część I. WNT Warszawa, 1999.
4. M.Ch.Klin, R. Poeshe, K. Rosenbaum, Algebra stosowana dla matematyków i informatyków. WNT, Warszawa, 1996.
5. K. Nomizu, Fundamentals of Linear Algebra, McGrow-Hill, Inc., New York 1966.
6. G. Birkhoff, T.C. Bartee, Modern Applied Algebra, McGrow-Hill Book Company, New York 1980.