SYLLABUS

SUBJECT: MATHEMATICAL ANALYSIS

TEACHER: Prof. UR ZBIGNIEW SURAJ, PhD, DSc

COURSE DESCRIPTION:
The purpose of the course is to provide the students with the fundamentals of mathematics used in computer science applications.

LECTURE:
The limit of sequence. Sufficient condition. Existence of limit. Number *e*. Theorems concerning limits. Examples. The sum of series. Series of positive terms. Tests for convergence. The geometric series, absolute convergence of series. Operations on the series. The limit of a function, continuity. The derivative. Higher order derivatives. Rules of differentiation. Application of the derivative. *Lagrange* and *Taylor`s* theorems and its applications. Extreme values. Concavity and intervals of monotony function. Asymptotes. Partial derivatives. *Taylor`s* formula for the function two variables. Local extreme values. The Indefinite Integral. Methods of integration. *Riemann`s* integral and its applications. Improper Integrals (unbounded interval, unbounded integrand). The functions series and power series. Differentiation and integration of power series. *Taylor*`s and the *Maclaurin*`s series for function f. Differential Equations and their solutions. Types of differential equations. The Cauchy problem (initial value problem) for a differential equation. The solution techniques for first-order equations. The second-order linear equations with constant coefficients.

CLASSES:
Practical exercises concerning realization of basic notions from lectures; limit of sequence, convergence of series, operations on the series, application of the derivative, local extreme values of the function two variables, application of Riemann`s integral, expanding function in power series, solution techniques for ordinary differential equations.

LEARNING OUTCOME:
Students will acquire a basic knowledge about fundamentals of mathematics.

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

TIMETABLE:
LECTURE: 2h x 15 weeks = 30 hours (1 semester)
CLASSES: 3h x 15 weeks = 45 hours (1 semester)

TEXTBOOK AND REQUIRED MATERIALS:

1. L. I. Holder, Calculus with Analytic Geometry, Wadsworth Pub. Com., California.
2. K. Kuratorski, Rachunek różniczkowy i całkowy, PWN (1979).
3. R. Rudnicki, Wykłady z analizy matematycznej, PWN (2002).
4. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, PWN, (wyd. dowolne).
5. G. M. Fichtenholz, Rachunek różniczkowy i całkowy, PWN (wyd. dowolne).

PREREQUISITES:
High school course in mathematics.