Course title: Boundary element method	**Neptun code: GEMET406-a**

Course coordinator: Gyorgy SZEIDL, Professor Emeritus, DSC

type and number of lesson: 2 lectures/ week

method of accountability: colloquium

curriculum location of the subject: autumn/**spring**

pre-study conditions: GEMET401-a Continuum mechanic

The task and purpose of the subject:

The boundary element method, like the finite element method, is a tool for the numerical solution of mechanical problems. Several serious commercial software systems exist. The main objective of the course is to introduce the students to the basics of the boundary element method. Within the framework of the course, special emphasis will be given to the technique of generating basic solutions, since the method is based on it. A further aim is to review the basic concepts and the principles that underlie the numerical solution of the relevant singular integral equations in such a way as to enable students to use commercially available boundary element programs.

Course description:

The concept of the fundamental solutions and techniques for calculating them for the Poisson equation and for problems in elasticity in plane and space. Green's and Somigliana-type identities. Derivation of singular integral equations of the direct and indirect boundary element method for Poisson's equation and for 2D and 3D problems of elasticity including interior and exterior domains. Issues of approximation on the boundary of the domain under consideration as well as within the domain. The structure of the system of linear equations to be solved and the technique of computing the solutions on the boundary of the domain and at the interior points of the domain. A brief overview of time-dependent problems. Applications to some engineering problems.

Required literature:

1. György Szeidl: Intruduction to the boundary element method. (Hand written notes given freely to the students.)

Recommended literature:

1. Jaswon, M. A., Symm, G. T.: Integral Equation Methods in Potential Theory and Elastostatics, Academic Press, London, 1977.