Course Unit Descriptor

Study Programme: Civil Engineering

Course Unit Title: Hydraulics 2

Course Unit Code: GH531

Name of Lecturer(s): Budinski Ljubomir

Type and Level of Studies: master

Course Status (compulsory/elective): elective

Semester (winter/ summer): summer

Language of instruction: english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 5

Prerequisites: none

Course Aims:.

Theoretical and practical consideration of the unsteady flow in different media with the purpose of practical application.

Learning Outcomes:
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.

Syllabus.
Fundamentals of Fluid Mechanics. Navier-Stokes and Reynolds equation. One-dimensional unsteady flow in open channels. Principles of numerical solution. Application of various numerical methods and schemes to solve St. Venant equations. Application of internal and external boundary conditions with regard to the practical use. Transient flow. Model stiff and elastic shock. Methods characteristics as the basic model for solving the water hammer equations. Analysis of various types of boundary conditions in terms of practical applications. Analysis and application of a software package for modeling of the water hammer process. Unsteady flow in porous media. Solving the Laplace and Poisson equations by using the principles of numerical solution. Application software package for 3D modeling of flow in porous media.

Required Reading:
Relevant literature in English, tbd

Weekly Contact Hours:2	**Lectures: 4**	**Practical work: 1**

Teaching Methods:
Teaching is performed interactively in the form of lectures, auditory, laboratory and computer practice. At lectures, theoretical part of the course content is presented, followed by the characteristic examples for easier understanding of the course content. At auditory practice, characteristic exercises are solved and the course content is explained in more detail. At laboratory practice, acquired knowledge is practically applied on the available laboratory equipment. Apart from lectures and practice, consultations are regular. A part of the course content that makes a logical unit can be taken during the teaching process in the form of partial examinations. Partial examinations are taken in written form and as tests. Examination grade is made on the basis of: lecture and practice (auditory, laboratory and computer) attendance, partial examination grade and written examination grade (combined exercises and theory).

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Attendance			
Computer exercises			
Tests (4x)			