Study program: Civil Engineering

Course: Hydrotechnics

Professor/assistant: PhD Zoran Bonić / Milan Protić

Status of course: compulsory

ECTS credits: 6

Pre-requisites: none

Aims of the course:

The main aim of the course is to prepare a student to:

- acquire knowledge about the basic concepts and laws in the field of rest and movement of liquid body;
- successfully use the acquired knowledge to determine the constituent elements of hydrotechnical facilities in the field of dams and regulation of watercourses;
- solve the tasks in determining the hydraulic parameters used in the process of constituting and building a network for water supply and sewerage of settlements;
- get acquainted with the basic types of dams.

Learning outcomes:

After successfully finishing the course, a student is capable of:

- calculating flow in closed watercourses;
- calculating the leakage for known hydrological parameters;
- setting up a simple model of hydrodynamic movement;
- applying the acquired knowledge in the construction of hydraulic structures;
- calculating simple systems of water supply and sewerage of smaller settlements;
- calculating the stability of the gravity concrete dam.

Syllabus:

Theoretical part

Use and protection of water and protection against water. Water balance equations and coefficient of onflow. Measurement of water levels, flow measurement and flow rate. Determination of flow through water levels. Properties of liquids: density, specific gravity, shear force, slippery surface and viscosity. Pressure. Pascal's Law. Archimedes Law. The equation of continuity. Bernoulli equation. Circulation in conductor pipes under pressure. Designing a water supply system for the settlement. Designing a water supply network in the settlement. Designing a home water supply network. Designing sewerage network. Designing home sewage. Calculation and control of the stability of the dam. Accumulation. River regulation. Embankment.

Practical part

Preparation of seminar papers: Mapping of data obtained by measuring water speed and calculation of medium speed and unit flow, medium speed diagram. Concrete examples from hydraulics and hydrostatics. Dimensioning the water supply network with the determination of the relevant flow. Dimensioning the sewerage network. Determination of fulfillment of stability conditions for the supporting wall.

Literature:

1. Đurđević M., *Hidrotehnika: Predavanja*, VGGŠ, Beograd, 2009
2. Aranđelović, D., *Hidraulika u oblasti građevinarstva*, GAF, Niš, 2000.
3. Kapor G., *Hidraulika*, Građevinski fakultet, Beograd, 2008.
4. Ljubisavljević D., Đukić A., Babić B., Jovanović B., *Komunalna hidrotehnika: pimeri iz teorije i prakse*, Građevinski fakultet Beograd, 2010.

Number of active classes			Other forms of teaching:
Lectures: 2	Practical classes: 2	Laboratory classes: 1	

Teaching methods:

Interactive classes incl. solving practical examples. Practical exercises with an active approach to solving practical problems from technical practice.

Grading system (maximum 100 points), **grading scale** from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.

Pre-commitments	points	Final exam	points
activity during lectures and practical	10	written exam	-
colloquium(s)	20 + 20	oral exam	30
seminar paper(s)	20		
Sum	**70**	**Sum**	**30**