

| | |
|---|---------------------------------|
| Title Fluid Mechanics I | Code ISS1S-2-MP |
| Field Environmental Engineering | Year / Semester 1 / 2 |
| Specialty - | Course core |
| Hours Lectures: 3 Classes: 2 Laboratory: 1 Projects / seminars: - | Number of credits 5 |

Lecturer:

Prof. dr hab. inż. Janusz Wojtkowiak
Wydział Budownictwa i Inżynierii Środowiska
ul. Piotrowo 5
60-965 Poznań
tel. 6652442, fax. 6652439
e-mail: janusz.wojtkowiak@put.poznan.pl

Faculty:

Faculty of Civil and Environmental Engineering
ul. Piotrowo 5
60-965 Poznań
tel. (061) 665-2413, fax. (061) 665-2444
e-mail: office_dceef@put.poznan.pl

Status of the course in the study program:

Basic course

Objectives of the course:

Understanding of phenomena and rules concerning fluid at rest and fluid flows. Ability to use basic fluid mechanics knowledge for environmental engineering equipment and system calculations and designing.

Course description:

Basic physical properties of fluids. Hydrostatics – pressure, hydrostatic force, equilibrium equation of fluid, buoyancy and floatation. Hydrostatic force on plane and curved surfaces. Fundamentals of fluid kinematics. Mass conservation equation. Bernoulli equation for inviscid and viscous fluids. Laminar and turbulent flows. Forces of immersed objects, resistance of motion. Calculations of viscous flow in ducts. Water hammer phenomenon. Force and torque by the flow on the walls. Orifice flow, tank discharge. Weirs. Open channel flows. Underground water motion. Water inflow to traditional and artesian wells. Drains and channels. Wells system interaction. Calculation of gas tank discharge and gas flow in pipes. Bernoulli equation for adiabatic gas flow. Orifice and nozzle gas flows. Atmospheric pressure distribution.

Initial knowledge:

Mathematics (high school and semester I university) and physics (high school and semester I)

Teaching methods:

Lectures, tutorials, laboratories

Assessment methods:

Written examination (lectures), written final test (tutorials)

Bibliography:

1. Mechanika płynów w inżynierii środowiska., Z. Orzechowski, J. Prywer, R. Zarzycki, WNT, Warszawa, 2001
2. Mechanika płynów w inżynierii i ochronie środowiska., M. Mitosek, PWN, Warszawa, 2001
3. Mechanika Płynów w środowisku naturalnym., K. Rup, Wydawnictwo PK, Kraków, 2003
4. Fluid Mechanics., F. M. White, McGraw-Hill, New York , 2003