

Course title: <b>State of the art in water and wastewater analyses</b> <b>Stan wiedzy w zakresie analizy wody i ścieków</b>		
<b>Program: Master Program</b> <b>Field of study:</b> <b>Environmental Engineering</b>	<b>Year of study: 2nd</b>	<b>Semester: Summer</b>
<b>Code:</b>	<b>Type: elective</b>	<b>ECTS points: 2</b>
<b>Unit</b>	Institute of Water Supply and Environmental Protection	
<b>Module leader</b>	dr Przemysław Kułakowski	
<b>Teachers</b>	dr Przemysław Kułakowski, dr Tomasz Baczyński, dr Małgorzata Kryłów, dr Piotr Beńko	

**Module structure:**

- Lectures: 15 hours/sem
- Exercises 9 hours/sem
- Laboratory work 6 hours/sem
- Students own work 15 hours/sem

**Key words:** water, wastewater, analytical methods, instrumental analyses, interpretation of results, verification of results

**Teaching effects:** understanding of water and wastewater quality estimation, competence in assessment of water and wastewater treatment processes, bases of instrumental analyses

**Program (lectures):**

- Basic terms (1 h)
- Elements of measuring system (1 h)
- Repartition of analytical methods (1 h)
- Instrumental analyses methods: conductometry, pH, redox potential, ion selective electrodes, VIS and UV spectrophotometry, inductively coupled plasma, gas and liquid chromatography, mass spectrometry, specific methods, total organic carbon (6 h)
- Technological test of wastewater characteristic: AUR, NUR, PRR (2 h)
- Methods of data evaluation (2 h)
- Use of modern analytical methods in water and wastewater treatment process control (1 h)
- Legal aspects of analytical demands (1 h)

**Program (exercises)**

- Methods of estimation of the results accuracy (4 h)
- Validation of analytical methods (5 h)

**Program (laboratory works)**

- *Technological test of wastewater characteristic: AUR, NUR, PRR (3 h)*
- Analysis of results, their verification and estimation (3 h)

**Program (student's own work):** preparation to laboratory work on the base of literature

**Pre required modules:** Environmental chemistry

**Minimum course requirements (passing criteria) :**

- Lectures: test 60%
- Laboratory work and report: 40%

**Literature:**

Loconto P. R.: Trace Environmental Quantitative Analysis, CRC Press 2006  
Hocking M. B.: Chemical technology and Pollution Control, Elsevier, 2005  
Dojlido J. Zerbe J.: Instrumentalne metody badania wody i ścieków, Arkady, Warszawa, 1997  
Dojlido J.: Chemia wody, Arkady, Warszawa, 1998