

REQUIREMENTS
18/2017 academic year II. semester

Name and code of the subject: Environmental technologies I - Soil remediation, soil protection, biotechnology in agriculture, MTMKG7013A

Name and title of the person responsible for the subject: Dr. habil. Attila Nagy, associate professor

Additional instructors involved in teaching the subject:

Name and level of the program: Agricultural Water Management Engineering MSc

Subject type: optional

Teaching timetable of the subject, type of examination: 2+1 K

Credit value of the subject: 3

Purpose of teaching the subject: This course reviews the basic knowledge of soil pollution, characterization methods of polluted sites, regulations of remediation in Hungary, contamination transport processes in soils, and biological, chemical, physical, phytoremediation (clean-up) technologies in details. Introduction of the reasons and consequences of the main soil degradation processes. Introduction of the technical, agronomical, soil protection, chemical, mechanical, complex amelioration and recultivation methods suitable for the moderation of the unfavourable effects.

Content of the subject (14 weeks):

1. Definition of remediation, national and international background and main steps of remediation plans and environmental status assessment
2. Requirements of site characterization, regulation for underground water and geological medium in EU
3. Sampling methods, impoundment methods for contaminated sites
4. Pollution transport in soil and pollution distribution and transformation in soil
5. Aspects of appropriate remediation technologies
6. In-situ and ex-situ physical remediation methods
7. In-situ and ex-situ chemical remediation methods
8. In-situ and ex-situ biological remediation methods, Phytoremediation methods
9. The soil conservation, land reclamation, environmental and soil acidification, salinization, secondary salinization, soil structure degradation, soil compaction.
10. Improving acidic and saline soils.
11. Improve sandy soils, improving soil physical properties of deep ploughing.
12. Water erosion. Technical and agronomic possibilities of protection against erosion.
13. Wind Erosion. Protection against deflation agronomic possibilities.
14. Complex amelioration (soil improvement, drainage, surface drainage and subsurface drainage).

Type of mid-term examination:

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): written exam

Teaching aids:**Recommended literature:**

1. Prasad, MNV. 2005. Trace Elements in the Environment: Biogeochemistry, Biotechnology, and Bioremediation CRC Press/Taylor & Francis Group Boca Raton FL 33487 USA 744 ISBN 978-1-56670-685-8
2. P Lens, T Grotenhuis, G Malina, H Tabak 2005. Soil and Sediment Remediation. IWA Publishing London SW1H 0QS United Kingdom 544 ISBN 9781843391005
3. Neilson, Alasdair H. 2007. Environmental Degradation and Transformation of Organic Chemicals. Taylor & Francis (USA) Philadelphia, PA 19106 USA ISBN 9780849372414
4. Mirsal I.A. 2004. Soil pollution: Origin, Monitoring and Remediation Springer 312. ISBN: 978-3-540-70775-5
5. Saligram Bhatt (2004): Environment Protection and Sustainable Development. APH Publishing. 241. p. ISBN 9788176485128