

Soil Management (2nd Year, 2nd semester)

Credit value (ECTS) 4

Course category

Domain (Imposed)

Course holder:

Prof. Dr. Gerard JIȚĂREANU

Discipline objectives (course and practical works)

The goal of *Soil Management (1)* is to present how to protect soil and enhance its performance, how can be raised the farm profitability and preserve environmental quality for decades to come. Soil Management show how to increase the crops productivity, reveal how to control tillage, crop rotations, soil amendments, and other management choices. Through these choices the soil structure can be changed also biological activity and chemical content of soil, the erosion rates are influenced, pest populations, nutrient availability and crop production.

Students has to be aware of how tillage can break up soil structure, speed the decomposition and loss of organic matter, increase the threat of erosion, destroy the habitat of helpful organisms, and cause compaction. They will have to acquire knowledge about main tillage systems for agriculture, explain the influence of different vegetation factors and they influence to crops and to evaluate the impact and the consequences of different systems on natural and agricultural ecosystems.

Practical works seek to clarify the levels of application of different tillage systems, to know how to compare the effects of different soil treatments on the soil profile; describe appropriate soil testing methods for different situations; analyze a soil test report in order to evaluate the soil for agricultural or horticultural use; discuss ways that human activity can destroy soil structure.

Contents (syllabus)

Course (chapters/subchapters)
The object of study, the history and the importance of <i>Soil Management</i>
1. Factors affecting the plant growth and ways to improve them 1.1 Temperature. 1.2. Light. 1.3. Air. 1.4. Water. 1.5 Ways to control and improve thermal, water and air regime in soils 1.6. The soil as a medium for plant growth and development. 1.7. The influence of soil physical properties on crops development.
2. Soil tillage 2.1. Tillage influence on physical, biological and chemical soil properties. 2.2. Classification of soil tillage. 2.3. Primary cultivation: Ploughing/Chisel, Scarification. 2.4. Secondary cultivation – discs stubble cultivators, disc or tined seedbed cultivators or various kinds of harrows. 2.5. Seed bed preparation.
3. Tillage systems 3.1 Conventional (traditional) tillage system. 3.2 Conservation tillage system.

4. Soil compaction

4.1 The soil compaction processes. 4.2. The effects of soil compaction. 4.3. Measures to prevent and combat soil compaction.

5. Seeding and tillage after sowing.

Practical works
The presentation of the laboratories: Soil Management (Agrotehnics), Agricultural Soil Physic/Chemistry – Institute of Research for Agriculture and Environment, Mobile laboratory for air quality monitoring, Lysimeter station. Work safety rules; Laboratory equipment and utensils; Standard Operation Procedures in laboratories.
Soil sampling and preparation for analysis (Mortar Grinder RM 200, Retsch crusher, Planetary Ball Mills)
Augering & soil sampling equipment (Dutch probes, Edelman auger, the Riverside auger probes set agrochemical percussion drilling - Cobra TT Hammer, Sample ring kits for undisturbed soil/modified probe roots, soil sampling kits containing volatile compounds).
Methods for measuring soil temperature and EC (electronic conductivity)
Methods for measuring soil water reserve in different farming systems.
Analysis and assessment of soil compaction. Soil penetration resistance (penetrologger Eijkelkamp, penetrometer FieldScout SC 900 – Spectrum)/ Bulk density (Sample ring kit for undisturbed soil)
Measuring saturated hydraulic conductivity in soil (Hauben permeameter)
Machinery and equipment in sustainable agriculture (No-till seeders).
Soil aggregate stability – Kemper Method (Eijkelkamp Wet sieving apparatus) / Tiulin Erikson Method
Soil tillage systems
Final colloquium of knowledge evaluation

Bibliography

1. Gerard Jitäreanu, 2015 - *Agrotehnica*. Vol I. Editura “Ion Ionescu de la Brad”, Iași. ISBN 978-973-147-198-3
2. Costică Ailincăi, Gerard Jitäreanu, Lucian Răus, Denis Țopa, 2013 – *Tehnologii de cultură și metode de protecție a solului*. Editura “Ion Ionescu de la Brad”, Iași. ISBN 978-973-147-121-1
3. Denis Țopa, Gerard Jitäreanu, Costică Ailincăi, Lucian Răus, 2013 – *Impactul unor sisteme minime asupra producției și fertilității solului*. Editura “Ion Ionescu de la Brad”, Iași. ISBN 978-973-147-122-8
4. Mihai Berca, 2011 – *Agrotehnica*. Editura Ceres, București. ISBN 978-973-40-0899-5
5. Teodor Rusu, Ileana Bogdan, Adrian Ioan Pop, 2012 – *Îndrumător de lucrări practice de Agrotehnică*. Editura Grința, Cluj Napoca. ISBN 978-973-126-409-7
6. Gerard Jitäreanu, Ioan Țenu, Petru Cojocariu, Nicolae Bria, Iosif Cojocar, 2007 – *Tehnologii și mașini pentru mecanizarea lucrărilor solului în vederea practicării conceptului de agricultură durabilă*. Editura Ion Ionescu de la Brad, Iași. ISBN 978-973-7921-95-6
7. Gerard Jitäreanu, Lucian Răus, Daniel Bucur, 2007 – *Ameliorarea, conservarea și valorificarea solurilor degradate prin intervenții antropice*. Editura Ion Ionescu de la Brad, Iași. ISBN 978-973-7921-94-9
8. Hillel Daniel - *Environmental Soil Physics*. ISBN-9780123485250

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Final Exam	Oral examination	50%
Labs Colloquium	Oral examination	10%
Partial exam	Written assessment	30%
Evaluation during the semester	Oral examination	10%

Contact

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