

Full Title:	Soil Science
Module Code:	SCIA S8Z01
Credits:	5
Valid From:	Semester 1 - 2016/17 (September 2016)
Module Delivered in	2 programme(s)
Module Description:	In this module, students will acquire a knowledge and understanding of the various soil types and factors that interact to effect soil chemistry, biology and physical composition and associated effects of various management regimes.
Learning Outcomes:	
<i>On successful completion of this module the learner should be able to</i>	
<ol style="list-style-type: none"> 1. Critically assess aspects of soil biology, chemistry, physical and biochemistry in relation to soil structure and fertility, with particular emphasis on varying soil management regimes. 2. Appraise the fundamental factors that affect soil hydrology, nutrient storage and the movement of nutrients through a soil profile. 3. Perform laboratory and field analyses of various analytical methods specific to soil science applications and to critically analyse and appraise laboratory results. 4. Perform a soil survey efficiently and extrapolate land use potential and drainage characteristics from the data obtained. 5. Synthesize soil nutrient information and develop a nutrient management plan for selected farms adhering to relevant legislation. 	

Module Content & Assessment

Indicative Content

Soil Science Principles (30%)

Soil genesis, geology and geomorphology; Soil taxonomy and land use; Soil water and hydrology; Aggregate and micro-aggregate stability; Soil mineralogy; geophysical surveys; Soil fertility and soil productivity; Soil as a medium for plant growth; Soil organic matter; Plant-soil macronutrient relations; Micronutrient and toxic elements; Soil fertility evaluation and fertiliser use; Soil surveys and nutrient management planning; Soil ecology and biodiversity; Micro-organism (bacteria/fungi) – plant relationship. Microbial degradation of soil organic matter pools and CO2 sequestration.

Soil Science applications (20%)

Effects of farming operations on soils, plant growth and greenhouse gas emissions from soils; Interaction of mechanisation systems on soil structure; soil management techniques and interaction with crop and animal husbandry systems; Soil conservation and erosion; Soil drainage characterization; Soil contamination, remediation, geophysical and remote sensing techniques; Soil and groundwater contaminant tracers; Land and the world food supply; Linking soil and water management to sustainable agri-food and bio-resource production systems; Soil related policy and legislation. Development of an environment protection plan.

Lab practicals, soil survey and nutrient management plan (50%)

Soils and land use; Soil sampling, laboratory analysis and devise a nutrient management plan (Eg GLAS). Lab practicals; • Determination of soil texture, particle density, bulk density, aggregate stability and porosity. Examination of residual soil parent materials. • Determination of soil pH, lime requirement, conductivity, available nutrients, selected micro-nutrients, mineral matter and organic carbon. • Determination of soil microbial activity and identification of soil macro-organisms.

Assessment Breakdown

	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Full Time

Course Work

Assessment Type	Assessment Description	Outcome addressed	% of total	Marks Out Of	Pass Marks	Assessment Date	Duration
Project	Creation of a nutrient management plan for selected farms adhering to relevant legislation.	1,2,5	10.00	0	0	End of Year	0
Practical/Skills Evaluation	Determination of soil texture, particle density, bulk density, aggregate stability and porosity; Examination of residual soil parent materials; Determination of soil pH, lime requirement, conductivity, available nutrients, selected micro-nutrients, mineral matter and organic carbon; Determination of soil microbial activity and identification of soil macro-organisms; Soil survey on selected soil types.	3,4,5	40.00	0	0	n/a	0

No Project

No Practical

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Marks Out Of	Pass Marks	Assessment Date	Duration
Formal Exam	n/a	1,2,5	50.00	0	0	End-of-Semester	0

Reassessment Requirement

A repeat examination

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

DKIT reserves the right to alter the nature and timings of assessment

Module Workload & Resources

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Workload: Full Time				
Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
				6.00
		Total Weekly Contact Hours		6.00

This course has no Part Time workload.

Resources

Recommended Book Resources

Schaetzl, R. and Thompson, M.L. 2015, *Soils: Genesis and Geomorphology*, 2nd Ed., Cambridge University Press [ISBN: 978-110701693]

Bujang B.K. Huat, Arun Prasad, Afshin Asadi, Sina Kazemian 2013, *Geotechnics of Organic Soils and Peat*, CRC Press [ISBN: 978-0415659413]

Manoj K. Shukla. 2011, *Soil hydrology, land use and agriculture: measurement and modelling*, Cambridge, Mass [ISBN: 9781845937973]

David L. Rowell. 1994, *Soil science : methods and applications* [ISBN: 0582087848]

P.C. Bandyopadhyay 2007, *Soil analysis*, New Delhi : Gene-Tech Books [ISBN: 9788189729691]

Keith A. Smith, Chris E. Mullins. 2001, *Soil and environmental analysis: physical methods*, New York : M. Dekker [ISBN: 0824704142]

Recommended Article/Paper Resources

Vincent de Paul Obade and Rattan Lal 2013, *Assessing land cover and soil quality by remote sensing and geographical information systems (GIS)*, Catena, 104, 77–92

A.R. Dexter, G. Richard, D. Arrouays, E.A. Czyż, C. Jolivet , O. Duval 2008, *Complexed organic matter controls soil physical properties*, Geoderma, 144, 620–627

This module does not have any other resources

Module Delivered in

Programme Code	Programme	Semester	Delivery
DK_SAGRI_8	<u>Bachelor of Science (Honours) in Agriculture</u>	5	Mandatory
DK_SAGRI_7	<u>Bachelor of Science in Agriculture</u>	1	Elective