

# Soil Science

## Programmes

- Master of Environmental Soil Science
- Master of Soil and Environmental Microbiology
- Master of Tropical Soil Management
- M.Sc. in Environmental Soil Science
- M.Sc. in Soil and Environmental Microbiology
- M.Sc. in Tropical Soil Management
- Master of Philosophy (M.Phil.)
- Doctor of Philosophy (Ph.D.)

## About the Board of Study

The Board of Study in Soil Science focuses on developing research skills of postgraduate students providing with an in-depth knowledge on theoretical aspects and wide practical exposure on applications in Soil Science. The courses offered by the Board of Study cover major sub disciplines including Soil Physics, Soil Chemistry and Mineralogy, Soil Biology, Soil Fertility and Plant Nutrition and Soil Genesis Classification emphasising both environment and agronomic significance. Many courses encompass a practical component making students exposed to a range of laboratory and field analytical techniques. Research students could get an additional exposure to analytical techniques by following courses such as Techniques in Soil Plant, Water and Fertilizer Analysis, Tracer Techniques in Soil and Plant Studies and Advanced Instrumentation. Besides Environmental Pollution and Control, Soil-plant-water Systems, Plant - microbe Interactions, Social and Legal Aspects of Land Management, Land Use and Environment are examples of courses in interdisciplinary nature which are also offered to the students of other Boards of Study as well.

## Recent Research

*Following are on going research of postgraduate students :*

- \* Establishment of baseline concentration of trace metals in soils
- Quantification of carbon sequestration in agricultural soils
- Assessment of Diversity of soil biota in disturbed soil environment
- Morphology, characterization, classification and mapping of soils of Sri Lanka
- Digital soil mapping using soil information such as digital elevation data, proximal as remotely sensed information at soil legacy data
- Proximal soil sensing for spatial characteristics of soil quality
- Exploring the short scale soil variability to support site-specific management of paddy
- Assessment of greenhouse gas emissions and characterization of responsible microbes
- Assessment of contamination of agro-environments with antibiotics
- Identification of beneficial management practices to enhance the soil fertility
- Production of bio fertilizers for rice and vegetables
- Reclamation of nitrate contaminated groundwater
- Assessment of bio availability of contaminants in soil to plants and humans.
- Speciation of potentially toxic trace elements in soil & water by x-ray absorption fine structure spectroscopy

# Master of Environmental Soil Science

No. of Credits: 30

Minimum Programme Duration: 3 semesters

Entry Requirements: Bachelor's degree in agriculture, science or an equivalent qualification acceptable to the Senate of the University of Peradeniya.

## Overview

The Masters Degree in Environmental Soil Science blends the essential theories of biological, chemical and physical scientific concepts in a manner that allows critical examination of environmental quality of the Earth acknowledging the pivotal role played by soils as one of the most important natural resources.

## Key features

The students will be trained to assess the impact of pollutants/contaminants on quality of soil, atmosphere and water resources and their specific role in environmental sustainability. Students will be given an exposure to real-world environmental issues and make aware of challenges and has to find solutions.

With the pressing environmental problems that exist worldwide and the ever-increasing world population, the need for well-trained environmental soil scientists has never been greater. The graduates of environmental soil science always select challenging career paths working with other professionals to solve complex environmental problems.

Code	Title	Credits	Option
<b>First Semester</b>			
SS 5101*	Fundamentals of Soil Science	1	Pre-requisite
SS 5110	Environmental Soil Physics	3	Compulsory
SS 5111	Environmental Soil Chemistry	3	Compulsory
SS 5113	Environmental Microbiology	2	Compulsory
SS 5152	Analytical Techniques in Soil, Plant, Water & Fertilizer	3	Compulsory
SS 5198	Directed Study	5	Compulsory
SS 5199	Seminar	1	Compulsory
SS 5107	Formation and Characteristics of Tropical Soils	2	Elective
SS 5109	Microbial Ecology	3	Elective
SS 5114	Digital Soil Mapping	2	Elective
SS 5156	Water Quality and Environment	2	Elective
SS 6101	Tracer Techniques in Soil and Plant Studies	2	Elective
AE 5152	Environmental Impact Assessment	2	Elective
ST 5155	Design and Analysis of Experiments	2	Elective
<b>Second Semester</b>			
SS 5298	Directed Study	5	Compulsory
SS 5199	Seminar	1	Compulsory
SS 5212	Soils of Sri Lanka	1	Compulsory
SS 5251	Organic Pollutants and Environment	2	Compulsory
SS 5252	Environmental Impact of Inorganic Pollutants and Radio-nuclides	3	Compulsory
SS 6203	Land Use and Environment	1	Compulsory
SS 6204	Remediation of Contaminated Soil and Water	2	Compulsory
SS 5253	Solid Waste and Environment	2	Elective
SS 5254	Environmental Biotechnology	2	Elective
SS 6202	Environmental Soil Mineralogy	2	Elective
SS 6205	Advanced Instrumentation in Environmental Research	2	Elective
SS 6206	Soil Environmental Modelling	2	Elective
SS 6207	Applications of Digital Soil Mapping	2	Elective
CS 5212	Scientific Writing and Proposal Formulation	2	Elective

\* For non-agricultural graduates with the advice of the Board/ Programme Coordinator

Note: Any course offered from the other degree programmes of the BS Soil Science can be credited pertaining to the PGIA Guidelines and with the consent of the Programme Coordinator.



# Master of Soil and Environmental Microbiology

No. of Credits: 30

Minimum Programme Duration: 3 semesters

Entry Requirements: Bachelor's degree in agriculture, science or an equivalent qualification acceptable to the Senate of the University of Peradeniya.

## Overview

Reduction in soil productivity due to intensive agriculture and pollution of water and contamination of the food chain has become a great health concern to humans worldwide..

The Master of Soil and Environmental Microbiology programme is designed to provide an in-depth knowledge on eco-physiology of microorganisms with a greater emphasis on soil inhabitants and to train personnel on designing and developing eco-friendly techniques using soil microorganism for the sustainable management of soil and environmental health.

## Key features

The Masters programme in Soil and Environmental Microbiology offers an unique opportunity to be exposed to the interdisciplinary science of microbiology and Soil Science . The potential of applying microbial techniques to solve environment related issues will be discussed emphasising the ecological theories, Impact assessment, legal enactments.

The knowledge and skills acquired by the students following this degree programme enables them to address environment related issues by developing techniques particularly the bio-fertilizer and waste management, remediation soil and water, improve crop production of soil growth, and waste management.

Code	Title	Credits	Option
<b>First Semester</b>			
SS 5108	Soil Ecosystems and their Functions	2	Compulsory
SS 5109	Microbial Ecology	3	Compulsory
SS 5154	Plant-Microbe Interaction	2	Compulsory
SS 5198	Directed Study	5	Compulsory
SS 5199	Seminar	1	Compulsory
SS 5113	Environmental Microbiology	2	Compulsory
SS 5102	Physical Properties and Processes in Soils	2	Elective
SS 5103	Mineralogical and Chemical Properties of Soils	3	Elective
ST 5155	Design and Analysis of Experiments	2	Elective
PP 5108	Methods in Microbiology and Microbial Technology	3	Elective
PP 5109	Molecular Microbiology	2	Elective
<b>Second Semester</b>			
SS 5298	Directed Study	5	Compulsory
SS 5199	Seminar	1	Compulsory
SS 5212	Soils of Sri Lanka	1	Compulsory
SS 5254	Environmental Biotechnology	2	Compulsory
SS 5255	Special Topics Related to Microbiology	2	Compulsory
SS 5207	Reclamation & Management of Problem Soils in Sri Lanka	2	Elective
SS 5251	Organic Pollutants and Environment	2	Elective
SS 5252	Environmental Impact of Inorganic Pollutants and Radio- nuclides	3	Elective
SS 5253	Solid Waste and Environment	2	Elective
SS 6202	Environmental Soil Mineralogy	2	Elective
SS 6203	Land Use and Environment	1	Elective
SS 6204	Remediation of Contaminated Soil and Water	2	Elective
PP 5212	Aquatic Microbiology and Water Quality	2	Elective

# Master of Tropical Soil Management

No. of Credits: 30

Minimum Programme Duration: 3 semesters

Entry Requirements: Bachelor's degree in Agriculture, Science or an equivalent qualification acceptable to the Senate of the University of Peradeniya.

## Overview

The Masters degree in Tropical Soil Management provides essential skills and knowledge to manage soils in the tropical regions. The programme is designed to build up the knowledge progressively starting from soil formation to sustainable soil management, paying special interest on soil properties that are unique to the tropical belt. features which are unique to the tropics.

## Key features

Courses of the programme range from Soil Genesis to Soil Management providing the necessary theoretical background in Soil Physics, Soil Chemistry, Soil Mineralogy, Soil Microbiology, Soil Survey and Classification, Plant Nutrition, Soil Fertility and Land Use. Courses such as Formation and Characterization of Tropical Soils, Degradation and Conservation of Tropical Soils, Management of Tropical Uplands, Field characterization of Soils and Management of Tropical Wetlands are specially designed for this particular programme.

Code	Title	Credits	Option
<b>First Semester</b>			
SS 5106	Environmental Pollution and Control	2	Compulsory
SS 5107	Formation and Characteristics of Tropical Soils	2	Compulsory
SS 5153	Soil Morphology and Classification	2	Compulsory
SS 5198	Directed Study	5	Compulsory
SS 5199	Seminar	1	Compulsory
SS 5105	Introduction to Tropical Soils	1	Elective
SS 5114	Digital Soil Mapping	2	Elective
SS 5151	Management of Soil Organic Matter	2	Elective
SS 5152	Techniques in Soil, Plant, Water & Fertilizer Analysis	3	Elective
SS 6101	Tracer Techniques in Soil and Plant Studies	2	Elective
ST 5155	Design and Analysis of Experiments	2	Elective
<b>Second Semester</b>			
SS 5298	Directed Study	5	Compulsory
SS 5199	Seminar	1	Compulsory
SS 5201	Soil Fertility and Fertilizers	3	Compulsory
SS 5203	Degradation and Conservation of Tropical Soils	2	Compulsory
SS 5204	Management of Tropical Uplands	1	Compulsory
SS 5205	Management of Tropical Wetlands	1	Compulsory
SS 5209	Land Use Planning	2	Compulsory
SS 5202	Advanced Plant Nutrition	2	Elective
SS 5206	Social and legal Aspects of Land Management	2	Elective
SS 5207	Reclamation & Management of Problem Soils in Sri Lanka	2	Elective
SS 5208	Field Characterization of Soils	2	Elective
SS 6201	Techniques for Efficient Plant Nutrient Management	2	Elective
SS 6202	Environmental Soil Mineralogy	2	Elective
SS 6205	Advanced Instrumentation in Environmental Research	2	Elective
SS 6207	Applications of digital soil mapping	2	Elective
CS 5204	Crop Management Techniques	3	Elective
CS 5208	Organic Crop Production	2	Elective
CS 5212	Scientific Writing and Proposal Formulation	2	Elective



