Agricultural Engineering

Programmes

- Master of Agricultural & Bio-systems Engineering
- Master of Geo-Informatics
- Master of Integrated Water Resources Management
- M.Sc. in Agricultural & Bio-systems Engineering
- M.Sc. in Geo-Informatics
- M.Sc. in Integrated Water Resources Management
- Master of Philosophy (M.Phil.)
- Doctor of Philosophy (Ph.D.)

About the Board of Study

The Board of Study (BS) in Agricultural Engineering plays a significant role in agriculture higher education in Sri Lanka by offering three important postgraduate programmes in Integrated Water Resources Management (IWRM), Agricultural and Bio-systems Engineering and Geo-Informatics covering Agricultural Engineering related disciplines. These three postgraduate programmes have been developed considering the national education needs in related sectors and aiming at expanding the education initiatives in the region. The IWRM programme aims at producing multi-disciplinary professionals in water resources management with knowledge and skills from a scientific, technological, economic, social and environmental perspectives for integrated and sustainable use of water resources. The aim of Agricultural and Bio-systems Engineering programme is to produce agricultural and biosystems engineers capable of analysing, synthesizing and developing ingenious solutions for agricultural, biological and biochemical processes using scientific, mathematical and technological methods for increased and sustained productivity. Geo-informatics has been accepted around the world as a technology which benefits a large number of diverse disciplines. Hence, Geo-Informatics postgraduate programme aims at providing theoretical and practical knowledge in the fields of Geographical Information Systems (GIS), Remote Sensing and Global Positioning Systems (GPS) and related disciplines such as surveying, cartography, photogrammetry, spatial statistics etc.

In addition to the formal postgraduate programmes, Board of Study in Agricultural Engineering is very active in organizing training programmes, workshops and symposia for local and regional participants. Since its inception in 2001, the IWRM postgraduate programme has managed to secure fellowship programmes for the M.Phil students through Unilever Water Fellowship programme, Crossing Boundaries Project funded by the Netherlands Government and IDRC-SAWA fellowship project supported by IDRC, Canada. The Board of Study is closely working with the Cap-Net Lanka; the Sri Lankan network of the global network on Capacity Building in Integrated Water Resources Management. The Board of Study has a very strong research programme covering all major aspects in IWRM, Agricultural and Biosystems Engineering and Geo-Informatics. The teaching panel of the Board which consists of eminent professionals from universities, government and private sector institutions has made it an attractive place for Agricultural Engineering postgraduate education in the country.

Recent Research

The Board of Study carries out research in following thematic areas:

- Sustainable processing techniques for grains and perishables
- Climate change, gender and equity in Integrated Water Resources Management
- Groundwater contamination mapping using non destructive techniques
- Studies on urban water management
- Development and evaluation of grain harvesting machines
- Sustainable solutions for waste management and development of renewable energy
- Process control and automation
- Geo-Informatics in environmental conservation and management

Recently concluded student research:

- Environmental, socio-economic, technological and institutional perspectives of sanitation
- Impact assessment of intensified agriculture on stream water quality using interdisciplinary approaches
- Performance evaluation of four wheel tractor driven high capacity combined paddy thresher
- Real time simulation of tea leaves in trough withering using one dimensional heat and mass transfer mathematical model
- The effect of socio-economic and political factors in solid waste disposal and water pollution
- Sustainable water supply and sanitation through financing and institutional intervention
- Performance evaluation of landfill bioreactor "test cell" under dry zone conditions of Sri Lanka
- Pollution mitigation in landfill sites: removal of heavy metals using locally available filter materials
- Development of a microprocessor based embedded system for solar powered reverse osmosis water filtration system

Computer lab with GIS facilities

Master of Agricultural and Bio-Systems Engineering

No. of Credits: 30
Minimum Programme Duration: 3 semesters
Entry Requirements: Candidates possessing a Bachelor's degree, preferably in Agriculture, Engineering or Natural Sciences or any equivalent qualification from a recognized institute of higher education acceptable to the Senate of the University of Peradeniya.

Overview

Crop damage and postharvest losses due to climate change, increasing fuel costs and food security are some of the burning issues in agricultural sector which need immediate attention at present. The Agricultural and Biosystems Engineering degree programme addresses the issues on diligent use of technological inputs to establish sustainable agricultural production systems. Graduates of the M.Sc. occupy leading positions in many private, public and research sectors in Sri Lanka and elsewhere.

Key features

The postgraduate qualification in the field will help strengthen the knowledge base in six major fields; Automation and Robotic Control, Postharvest and Agro-processing, Energy and Waste Management, Farm Machinery, Climate Change & Water Management and Geo-informatics.

The Master programme is meticulously designed to provide the participants with a solid theoretical knowledge and sound practical experience which will make the students well suited for emerging as well as established industries alike.

Code	Title	Credits	Option
First Semester			
AE 5102	Thermodynamics	2	Compulsory
AE 5104	Engineering Drawing	2	Compulsory
AE 5106	Physical Properties of Agricultural Products	2	Compulsory
AE 5109	Soil Mechanics	2	Compulsory
AE 5111	Engineering Mechanics	2	Compulsory
AE 5112	Farm Mechanization	2	Compulsory
AE 5117	Numerical Analysis in Agricultural Engineering Applications	2	Compulsory
AE 5107	Water Quality for Agriculture and Environment	2	Elective
AE 5113	Principles of Farm Machinery	2	Elective
AE 5114	Agricultural Structures and Environment	2	Elective
AE 5115	Electronics and Instrumentation in Agriculture	2	Elective
AE 5116	Farm Machinery Testing and Evaluation	1	Elective
AE 5118	Principles of Post-harvest Biology and Technology	2	Elective
ST 5106	Computer Programming	2	Elective
Second Semester			
AE 5203	Food Process Engineering	2	Compulsory
AE 5204	Power and Energy for Agriculture	2	Compulsory
AE 5206	Fluid Mechanics	2	Compulsory
AE 5202	Water Application Systems	2	Elective
AE 5205	Ecologically Sustainable Industrial Development	1	Elective
AE 5207	Applied Heat Transfer	2	Elective
AE 5209	GIS for Natural Resources Management	2	Elective
AE 5210	Health, Sanitation and Wastewater Management	2	Elective
AE 5211	Hydraulics of Erosion and Sediment Transport	2	Elective
AE 5213	Bioreactor and Bio-Environment Design and Control Systems	2	Elective
AE 5214	Electrical Power and Machines	2	Elective
Second Year First Semester			
AE 5157	Solid Waste Management	2	Compulsory
AE 5198	Directed Study and Seminar	5	Compulsory
AE 5152	Environmental Impact Assessment	2	Elective
AE 5153	Principles of Ergonomics in Agriculture	2	Elective
AE 5154	Application of Remote Sensing in Agriculture	2	Elective
AE 5156	Environment and Industry	3	Elective
AE 5158	Organic Produce Certification and Marketing	1	Elective
AE 5159	Grading Packaging and Transportation of Fruits and Vegetables	2	Elective
AE 5160	Advanced Power and Machinery	2	Elective
AE 5161	Solar Energy Applications in Agriculture	2	Elective
AE 5162	Tillage Engineering	2	Elective
AE 5163	Analysis of Agricultural Systems	2	Elective
AE 5164	Combustion of Biomass	2	Elective
AE 5165	Natural Fibre Technology	2	Elective
AE 5167	Process Control and Automation	2	Elective
AE 6101	Advanced Irrigation Water Management	2	Elective
AE 6102	Advanced GIS and Geo-informatics	2	Elective

Master of Geo-Informatics

No. of Credits: 30
Minimum Programme Duration: 3 semesters

Entry Requirements: Candidates possessing a Bachelor's degree, preferably in Physical and Biological Sciences, Agriculture, Natural Sciences, Geography, Engineering, Medicine or any equivalent qualification from a recognized institute of higher education acceptable to the Senate of the University of Peradeniya.

Overview

Geo-Informatics has been accepted around the world as a technology which benefits a large number of diverse disciplines. It encompasses three basic technologies, namely Geographical Information Systems (GIS), Remote Sensing (RS) and Global Positioning Systems (GPS). In order to get the maximum benefit out of the fast growing and popular technologies of Geo-Informatics, it is imperative that one should have a general understanding of the related spatial disciplines such as Cartography, Photogrammetry, Surveying, Multimedia Technology and Statistics. Today, in Sri Lanka Geo-Informatics is used mainly for map preparation and rarely used for advanced applications. Hence, it is vital to identify the real potential of this technology to harness the maximum benefits.

Key features

The broad aim of this programme is to develop the required knowledge-based expertise and skills in Geo-Informatics and related spatial sciences to support the development agenda of the country. The core programme includes fundamentals of Remote Sensing, GIS and GPS, the theoretical concepts of other related disciplines, such as surveying, cartography and spatial statistics. It also covers applications of Geo-Informatics in natural resources management, forestry, agriculture and marketing.

Code	*Title*	*Credits*	*Option*
First Semester			
GS 5101	Introduction to Geographical Information Systems (GIS)	2	Compulsory
GS 5102	Introduction to Remote Sensing	2	Compulsory
GS 5103	Spatial Database Management	2	Compulsory
GS 5104	Fundamentals of Global Postioning Systems (GPS)	1	Compulsory
GS 5105	Surveying and Spatial Measurements	2	Compulsory
*ST 5101	Calculus and Matrix Algebra	2	Prerequisite
*ST 5102	Basic Statistics	2	Compulsory/ Prerequisite
ST 5106	Computer Programming	2	Elective
Second Semester			
GS 5201	Fundamentals of Spatial Statistics	2	Compulsory
GS 5202	Thematic Mapping, Cartography and Photogrammetry	2	Compulsory
GS 5203	Spatial Modelling and Analysis	2	Compulsory
GS 5204	Advanced GIS and Applications	3	Compulsory
GS 5205	Advanced Digital Image Processing	2	Compulsory
GS 5206	Microwave Remote Sensing	2	Compulsory
CS 5212	Scientific Writing and Proposal Formation	2	Elective
Second Year First Semester			
GS 5198	Directed Study	5	Compulsory
GS 6102	Advanced Remote Sensing and Applications	2	Compulsory
GS 6103	Recent Advances in Geo-Informatics	2	Compulsory
GS 6104	Spatial Data Infrastructure	1	Compulsory
GS 6101	Statistical Methods for Spatial Data analysis	2	Elective

** No credits will be given for prerequisite courses.*

Agricultural Engineering
research with advanced technology

Master of Integrated Water Resources Management

No. of Credits: 30
Minimum Programme Duration: 3 semesters

Entry Requirements: Candidates possessing a Bachelor's degree, preferably in Agriculture, Engineering, Humanities, Medicine, Natural Sciences or any equivalent qualification from a recognized institute of higher education acceptable to the Senate of the University of Peradeniya.

Overview

At present, there are numerous government, non-government and private sector organizations actively involved in developing and managing water resources in Sri Lanka. However, most of these organizations are unable to implement projects integrating and harnessing the water resources with ecosystems towards sustainable development and management objectives.

A new generation of scientists, researchers, engineers, geographers, social scientists should be trained in this new field of "Integrated Water Resource Management" enabling them to take up the challenge of providing adequate good quality water to the various water users while maintaining the delicate balance of the natural ecosystems. The Integrated Water Resources Management Programme has been designed to achieve the above goals.

Key features

This postgraduate programme is designed to produce multidisciplinary professionals in water resources management with knowledge and skills from a scientific, technological, economic, social and environmental perspective for integrated and sustainable use of water resources. The courses are designed to address these different perspectives so that students would be able to assess the water resources at river basin scale and allocate for different uses and users, to facilitate effective communication and dialogue among stakeholders to avoid conflicts, address issues, especially in relation to water pollution and employ remedial measures, manage water for irrigation and water supply & sanitation while maintaining the eco-systems, and develop methodologies to implement policies and legislations related to all aspects of water use in the country. The students are also provided with knowledge and skills to facilitate problem based interdisciplinary research in addressing current issues in the water sector.

Code	*Title*	*Credits*	*Option*
First Semester			
AE 5103	Hydrology and Meteorology	3	Compulsory
AE 5105	Water and Society	2	Compulsory
AE 5107	Water Quality for Agriculture and Environment	2	Compulsory
EC 5108	Water Resources Economics I	2	Compulsory
AE 5101	Water for Agriculture	2	Elective
AE 5109	Soil Mechanics	2	Elective
AE 5119	Water and Industry	2	Elective
EC 5107	Project Analysis	2	Elective
ST 5106	Computer Programming	2	Elective
Second Semester			
AE 5210	Health, Sanitation and Wastewater Management	2	Compulsory
AE 5202	Water Application Systems	2	Elective
AE 5206	Fluid Mechanics	2	Elective
AE 5209	GIS for Natural Resources Management	2	Elective
AE 5211	Hydraulics of Erosion and Sediment Transport	2	Elective
AE 5212	Water Supply	2	Elective
AE 6104	Interdisciplinary Field Research Methodology	3	Elective
AE 6105	Gender in IWRM	2	Elective
EC 5208	Water Resource Economics II	2	Elective
Second Year First Semester			
AE 5151	River Basing Planning & Management	2	Compulsory
AE 5152	Environmental Impact Assessment	2	Compulsory
AE 5198	Directed study	5	Compulsory
AE 6101	Advanced Irrigation Water Management	2	Compulsory
AE 5108	Groundwater Development	2	Elective
AE 5154	Application of Remote Sensing in Agriculture	2	Elective
AE 5155	Financing Water Development	2	Elective
AE 6102	Advanced GIS and Geo-informatics	2	Elective
AE 6103	Modelling Hydrological Systems	1	Elective