

# PROSPECTUS

2021 - 2025



**FACULTY OF AGRICULTURE**

**RAJARATA UNIVERSITY OF SRI LANKA**

**Puliyankulama**

**Anuradhapura**

**Sri Lanka**

# Prospectus 2021 - 2025

**FACULTY OF AGRICULTURE  
RAJARATA UNIVERSITY OF SRI LANKA  
Puliyankulama  
Anuradhapura  
Sri Lanka**

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*Vision*

*To be a dynamic, innovative and renowned  
centre for Excellence in Agriculture*

*Mission*

*To produce innovative and dynamic graduates with  
sound knowledge and requisite skills towards achieving  
a sustainable development in Agriculture, through  
creating a conducive environment for teaching,  
learning, research and dissemination of knowledge.*

## GRADUATE PROFILE



**The main aim of the degree programme is to provide students with a comprehensive tertiary-level education in agriculture and related areas of learning to produce competent graduates for global arena.**

**PROGRAMME LEARNING OUTCOMES OF THE STUDY PROGRAMME ALIGNED TO LEVEL DESCRIPTORS IN SLQF**

No.	Categories of the learning outcome	Level Descriptors	Programme Learning Outcomes (PLOs)
1	Subject / Theoretical Knowledge	Demonstrate an advanced knowledge and understanding of the core aspects of the area of study. Critically Analyse data, make judgments and propose solutions to problems.	Demonstrate advanced knowledge and understanding of the core aspects to fulfil the emerging needs in agriculture.
2	Practical Knowledge and Application	Construct and sustain arguments and use these arguments, ideas and techniques in problem solving. Use practical skills and enquiry efficiently and effectively within the area of study.	Construct, adopt, and apply suitable practical skills effectively and efficiently to critically analyse problems and propose innovative solutions for sustainable development in agriculture.
3	Communication	Communicate/present information, ideas, issues, and solutions efficiently and effectively. Demonstrate awareness of the current developments in the area of study.	Employ effective and efficient communication to enable proactive decision making for solving agricultural issues and raise awareness among the stakeholders.
4	Teamwork and Leadership	Exercise personal/team responsibility, and leadership in the professional environment/workplace.	Mediate effectively as a member or a leader in diverse teams and in multidisciplinary working environments to achieve synergistic outcomes.
5	Creativity and Problem Solving	Construct and sustain arguments and use these arguments, ideas and techniques in problem solving for a given situation.	Construct and innovate arguments, ideas, and techniques to solve problems in agriculture.
6	Managerial and Entrepreneurship	Take initiative, assume personal responsibility, and demonstrate accountability and ability to instil entrepreneurship.	Take initiatives and leadership to create, develop, and manage agricultural enterprises.

**PROGRAMME LEARNING OUTCOMES OF THE STUDY PROGRAMME ALIGNED TO LEVEL DESCRIPTORS IN SLQF**

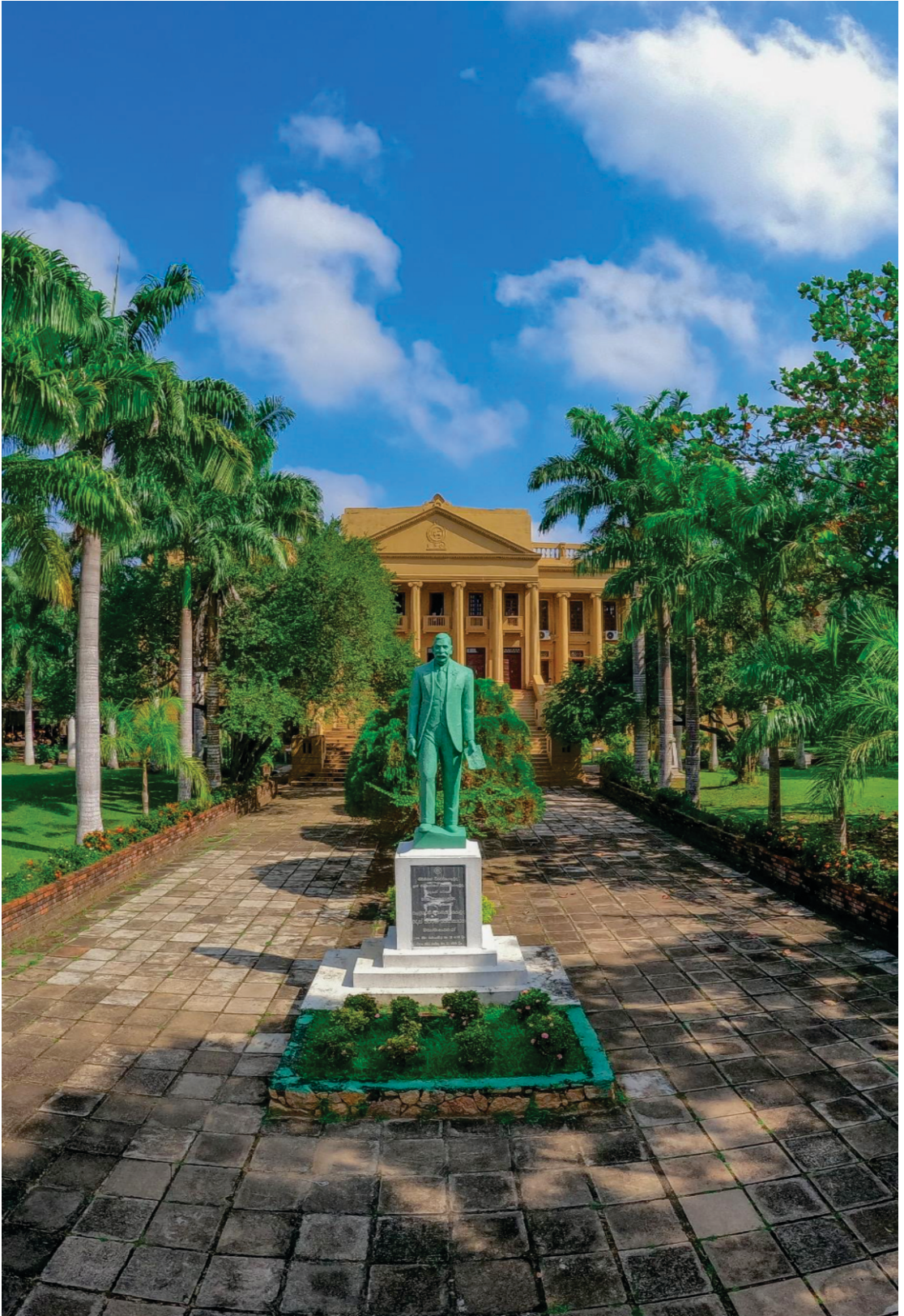
7	Information Usage and Management	Thorough in transferable skills related to ICT and information literacy.	Practice and customize modern ICT for enhancing efficiency in the agriculture sector.
8	Networking and Social Skills	Ability to work in teams, give leadership and promote social engagement.	Perform independently and collaboratively to build-up team spirit and leadership quality to promote social engagement.
9	Adaptability and Flexibility	Analyse and devise appropriate strategies for adapting in changing environment.	Analyse, apply, and integrate appropriate strategies to cater the dynamic challenges in the agricultural sector.
10	Attitudes, Values, and Professionalism	Exercise initiative, personal responsibility and accountability in tasks performed. Demonstrate positive attitudes and social responsibility.	Be self-responsible and accountable for the performed actions demonstrating positive attitudes and social responsibility.
11	Vision for Life	Clearly identify where one wants to be and develop long term goals accordingly Exercise and further develop the new competencies and assume major responsibilities with confidence.	Set long-term goals and be self-motivated and progressive personnel who seek challenges in contemporary agriculture.
12	Updating Self / Lifelong Learning	Undertake further training and develop additional skills that will enable them to make sound decisions. Engage in independent learning using scholarly reviews and secondary sources of information.	Inculcate the passion for lifelong learning to acquire values and additional knowledge with the mindset of contribution to agricultural development.

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## 1.0 INTRODUCTION TO RAJARATA UNIVERSITY OF SRI LANKA

The Rajarata University of Sri Lanka (RUSL) was established on 07<sup>th</sup> November 1995 under the section 25 of the University act number 16 of 1978 by amalgamation of resources of the Affiliated University colleges in the Central, North-western and North Central provinces. Over the years, the University has developed to become a centre of excellence in higher education in the North Central Province as well as in Sri Lanka. The academic programmes of the RUSL are offered by six faculties namely, Agriculture, Applied Sciences, Management Studies, Medicine and Allied Sciences, Social Sciences and Humanities and Technology. The main administrative complex, the Faculties of Applied Sciences, Management Studies, Social Sciences and Humanities and Technology are located at Mihintale, while the Faculty of Agriculture and Faculty of Medicine and Allied Sciences are located at Puliyankulama and Saliyapura, respectively.

### 1.1 SENIOR EXECUTIVES OF THE RAJARATA UNIVERSITY OF SRI LANKA

Chancellor	Ven. Ethalawatunuwawe Gnanathilaka Thero
Vice Chancellor	Prof. (Mrs) G.A.S. Ginigaddara
Registrar	Mr. A.M.G.B. Abeyasinghe
Bursar (Acting)	Mr. Sampath Godakumbura
Librarian	Mrs. A. S. Siriwardana

### 1.2 DEANS OF FACULTIES

Agriculture	Dr G.V.T.V Weerasooriya
Applied Sciences	Prof. Ranjith Edirisinghe
Management Studies	Prof. P.M.B. Jayathilaka
Medicine and Allied Sciences	Dr. Janaka Pushpakumara
Social Sciences and Humanities	Prof. D. Thusitha Mendis
Technology	Dr. T. C. Bamunuarachchige



**The Vice Chancellor  
Prof. (Mrs) G.A.S Ginigaddara**

### 2.0 INTRODUCTION TO FACULTY OF AGRICULTURE

The Faculty of Agriculture was established in 2001 with the aim of developing sustainable agricultural systems particularly focused on the production environment of the dry zone of Sri Lanka utilizing rural farming livelihoods and natural resources effectively. To achieve this goal, Faculty of Agriculture offers a Bachelor of Science Honours degree in Agriculture [BSc Hons (Agriculture)], of four-year duration. The Bachelor degree programme comprises of semester-based teaching evaluations in eight semesters, during which different courses are offered by the four academic Departments, namely Agricultural Engineering and Soil Science (ES), Agricultural Systems (AS), Animal and Food Sciences (AF) and Plant Sciences (PS).

The core programme spanning through the first five semesters is compulsory for all students. During the 6<sup>th</sup> and 7<sup>th</sup> semesters, students can select the Specialization module on their preference.

The Specialization modules are

- Agricultural Biology
- Agricultural Economics and Extension
- Agricultural Engineering
- Agricultural Systems and Management
- Animal Production and Technology
- Crop Science
- Environmental Soil Management
- Food and Postharvest Technology

At the end of the 7<sup>th</sup> Semester, students receive three-month industrial training with an industry. During the 8<sup>th</sup> semester, each student is required to conduct an individual research project under the guidance of supervisor/s in the selected specialization module.

In each course, one credit unit is equal to 15 hours of lectures or 30 hours of practical work/tutorials/assignments/field visits. Courses are identified by a course code with two letters and four numerical digits. The two upper case letters indicate the Department that offers the course. The first numerical digit indicates the academic year, the second the semester and the last two are the identification numbers of the course in the respective Department.

English language and Information Technology are offered by the ELTU and the computer centre respectively to enhance students' communication skills and employment opportunities. The prospectus includes information on all courses offered during the core programme and the specialization modules along with the regulations pertaining to the degree programme.

Students who complete all the requirements successfully are awarded the Bachelor of Science Honours degree in Agriculture.

## 2.1 CREDIT AND COURSE NOTATION

In each course, one credit unit is equal to 50 notional hours, which includes 15 hours of lectures or 30 hours of practical work/tutorials/assignments/field visits. The remaining balance of notional hours are assigned to directed learning and self-directed learning. Courses are identified by a course code with two letters and four numerical digits. The two upper case letters indicate the Department that offers the course. The first numerical digit indicates the academic year, the second the semester and the last two are the identification numbers of the course in the respective Department.

Example: - **ES1101 Analytical Chemistry (2/20:20:60)**

ES 1101 is the course Analytical Chemistry. Subject code (ES) indicates Department that offers the course i.e., Department of Agricultural Engineering and Soil Science. The number, first numeric denote the first year, second numeric denotes the first semester and by next two digits, the course number is 01.

The above notation is followed by a series of numerical digits within parentheses to indicate number of credits of the course and the proportional distribution of the notional hours to lectures, practical and independent learning hours.

In **ES1101 Analytical Chemistry (2/20:20:60)**, The course offers as a two-credit course with 20 hours of lectures, 20 hours of practical and 60 hours of independent learning. In total, this course offers 100 notional hours.

## 2.2 OFFICERS OF THE FACULTY OF AGRICULTURE

<b>Dean</b>	Dr. G.V.T.V. Weerasooriya
<b>Heads of Departments</b>	
<b>Agricultural Engineering and Soil Science</b>	Prof. N.S. Abeysingha
<b>Agricultural Systems</b>	Dr. A.M.K.R. Bandara
<b>Animal and Food Sciences</b>	Dr. N.W.I.A. Jayawardana
<b>Plant Sciences</b>	Dr. U.G.A.I. Sirisena
<b>Senior Assistant Librarian</b>	Mrs. W.P.T. Dilrukshi
<b>Assistant Registrar</b>	Mrs. K. Nathiparan
<b>Farm Manager</b>	Mr. B.W.N.J. Samaraweera
<b>Assistant Bursar (Acting)</b>	Mr. D.M.R. Samantha

## 2.3 MEMBERS OF THE FACULTY BOARD

Dean (Chairperson)

Heads of Departments

    Agricultural Engineering and Soil Science

    Agricultural Systems

    Animal and Food Sciences

    Plant Sciences

All permanent Senior Professors, Professors and Associate Professors

All Permanent Senior Lecturers and Lecturers

Two members elected among the Lecturers (Probationary) of the Faculty

Computer Instructor

English Instructor

Two students elected by the students of the faculty

Three external persons among persons of eminence in the areas of study

Faculty Assistant Registrar (Secretary / Convener)

Members on invitation

    Senior Assistant Librarian

    Lecturer (Probationary)

    Coordinator of ELTU

    Assistant Bursar

    Farm Manager

## 2.4 DEPARTMENT OVERVIEW AND MEMBERS OF THE ACADEMIC STAFF

### 1. Department of Agricultural Engineering and Soil Science

The vision of the department is to become a premier Agricultural Engineering and Soil Science entity for training and research, developing top-class Agricultural Engineers and Soil Scientists. The mission of the Department of Agricultural Engineering and Soil Science is to promote undergraduate and graduate students learning in Agricultural Engineering and Soil Science to provide engineering and soil science expertise in the field of agriculture.

The courses offered by the Department comprehend the learner with technologies related to soil, water, climate, land, machinery, and process engineering, which essentially rely on the development of inventive and sustainable agriculture. Core courses containing 24 credits offered by the department provides a solid scientific base with the necessary skills and knowledge to approach students to become Agricultural professionals. Further, the department offers two courses on Field practices in Agricultural Engineering & Soil Science and Operation & Maintenance of Two-Wheel and Four-Wheel Tractors during the practical-based semester to strengthen the hands-on experiences in agricultural operations. The department allows students to choose Specialization pathways in Agricultural Engineering and Environmental Soil Management, covering 28 credits.

The Agricultural Engineering Specialization (AE) provides comprehensive knowledge and skills on agricultural machine design and automated controls, water resources management, irrigation engineering, agrometeorology & climate change, energy & waste management, food engineering and GIS & remote sensing. This specialization module allows students to apply engineering technologies to formulate and solve problems related to resource management in crop and animal production in an eco-friendly manner. Further, this module provides opportunities to work in research laboratories, the engineering workshop, and field settings in agricultural machine designing and automated controls, water resources management, irrigation engineering, agrometeorology & climate change, energy & waste management, food engineering and GIS & remote sensing laboratories.

The Specialization module on Environmental Soil Management (ESM) has been designed to offer theoretical and practical knowledge on different branches of soil science. The students get comprehensive knowledge in soil-chemistry, -physics, -microbiology, and further, they learn different soil types in Sri Lanka and management strategies for sustainable soil management. The courses in Specialization ESM have been formulated to enhance the knowledge and skills of students in soil fertility evaluation and management, land use planning, soils of Sri Lanka, soil microbiology, and to work with soil-related emerging issues in research projects.

The department consists of a highly qualified, skilful academic staff and competent technical staff. The department is fully equipped with required resources and laboratory facilities that help the students improve their skills and knowledge in a competitive academic environment. The Analytical Service Laboratory of the department provides facilities to analyse plant, soil, water, and fertilizer at reasonable rates following standard analytical procedures to academics, researchers, graduate students, and the general public in the region. The GIS & remote sensing laboratory provides opportunities to explore and analyse the issues spatially and develop solutions with modelling and simulations.

## DEPARTMENT OF AGRICULTURAL ENGINEERING AND SOIL SCIENCE

Name	Academic Qualifications	Position	Specialization
Prof. M.H.J.P. Gunarathna	BSc (Agric.) (Ruhuna, Sri Lanka) MS (Agric. Eng.) (CLSU/IRRI, Philippines) PhD (Reg. Res. Envt. Eng.) (Kagoshima, Japan)	Professor	Irrigation and Water Management Crop and Environmental Modelling Climate Change
Prof. N.S. Abeysingha	BSc (Agric.) (Ruhuna, Sri Lanka), MSc (Forest. & Env. Mgt.) (Sri Jayawardenapura, Sri Lanka) PhD (Water Sci. & Tech.) (IARI, India)	Professor	Climate Change Science Watershed Management Hydrological Modelling
Prof. M.G.T.S. Amarasekara	BSc (Agric.) (Peradeniya, Sri Lanka) MPhil (Soil Sci.) (Peradeniya, Sri Lanka) PhD (IWRM) (Peradeniya, Sri Lanka)	Professor	Soil Fertility Management Integrated Water Resources Management
Prof. (Mrs.) M.K.N. Kumari	BSc (Agric.) (Ruhuna, Sri Lanka) MPhil Agric. Eng. (IWRM) (Peradeniya, Sri Lanka) PhD (Reg. Res. Envt. Eng.) (Kagoshima, Japan)	Professor	Water Quality Management Hydrology Climate Change
Assoc. Prof. (Mrs.) D.M.S.H. Dissanayaka	BSc (Agric.) (Peradeniya, Sri Lanka) MPhil (IWRM) (Peradeniya, Sri Lanka) PhD Envt. Eng. (Saitama, Japan)	Associate Professor	Waste management Water Resources Management Climate change
Dr. D.M.S. Duminda	BSc (Agric.) (Ruhuna, Sri Lanka) MSc Ind. & Envt. Chem. (Kelaniya, Sri Lanka) PhD (Soil Sci.) (Peradeniya, Sri Lanka)	Senior Lecturer	Soil Fertility Management Environmental Chemistry
Dr. G.V.T.V. Weerasooriya	BSc (Agric.) (Ruhuna, Sri Lanka) MPhil Agric. Eng. (Peradeniya, Sri Lanka) PhD (Peradeniya, Sri Lanka)	Senior Lecturer	Farm Power and Machinery

## DEPARTMENT OF AGRICULTURAL ENGINEERING AND SOIL SCIENCE

Name	Academic Qualifications	Position	Specialization
Dr. (Ms.) A.J. Fernando	BSc (Agric.) (Rajarata, Sri Lanka) MS (Ind. & Ag. Tech.) (ISU, USA) MPhil (Ag. & Bio Sys. Eng.) (Peradeniya, Sri Lanka) PhD (Ag. & Bio Sys. Eng.) (Peradeniya, Sri Lanka)	Senior Lecturer	Food Process Engineering Agricultural Machinery Engineering
Mr. P.D. Kahandage	BSc (Agric.) (Ruhuna, Sri Lanka) MSc (Peradeniya, Sri Lanka) MPhil (Ruhuna, Sri Lanka) PhD (Reading)	Senior Lecturer	Farm Power and Machinery Energy Management
Ms. J.P.H.U. Jayaneththi	BSc (Agric.) (RUSL) MSc (Peradeniya, Sri Lanka) MPhil (Peradeniya, Sri Lanka)	Senior Lecturer	Soil Microbiology Soil Fertility Management
Mr. R.A.A.S. Rathnayaka	BSc (Agric.) (Peradeniya, Sri Lanka) MPhil (Peradeniya, Sri Lanka) PhD (Peradeniya, Sri Lanka)	Lecturer	Soil Survey and Classification Digital Soil Mapping and Agricultural Land Use Planning
Ms. K.G.S. Nirmanee	BSc (Agric.) (Rajarata, Sri Lanka) MSc (Peradeniya, Sri Lanka) MPhil (Peradeniya) Reading	Lecturer (Prob.)	GIS and Remote Sensing, Water Management
Mr. E.J. Kosgollegedara	BSc (Agric.) (Rajarata, Sri Lanka) MPhil (Peradeniya) reading MPhil (Wayamba, Sri Lanka) reading	Lecturer (Prob.)	Farm Power and Machinery Electronics and Precision Agriculture



### 2. Department of Agricultural Systems

The Department of Agricultural Systems is one of the pioneering departments in the Faculty of Agriculture, having vast and long-term experience in providing quality teaching, research, training, consultancy, and outreach activities with a high level of capacities of the diverse expertise of the academic staff. The vision of the department is to be the leader in education, research, and outreach in the field of agriculture with a special focus on Agricultural Systems, Economics, Extension, and Data Management. It aims to serve society by producing skilful, socially responsible, and globally competitive intellectuals; catering to demand-driven research and providing advocacy to the stakeholders as indicated in its mission statement.

The department offers 22 credits in the core program covering a wide array of subjects related to Agricultural Economics, Extension, Agricultural Systems, Management, Agribusiness, Statistics and Data Science. The two specialization modules of the department, 1) Agricultural Economics and Extension and 2) Agricultural Systems Management have been designed to provide students with a more research-intensive focus and guide them to develop intellectual capacities ensuring their ability to identify, analyse, and apply the knowledge and skills gained in providing innovative solutions for current and future emerging issues. Furthermore, these modules benefit from using a range of statistical and analytical methodologies in solving policy and decision-making challenges encountered in the agricultural sector.

The undergraduate students who follow the Agricultural Economics and Extension specialization module will acquire the ability to apply advanced and cutting-edge insights on Economics, Extension, Business, Management, and Statistics to identify and analyse social, economic, and environmental problems encountered by the stakeholders in agriculture and create solutions to boost their competitiveness and sustainability. The blended multidisciplinary content offered by the module will position the undergraduates exceptionally well to play a leading role in the future agricultural business, public sector, and society.

The Agricultural Systems Management specialization module facilitates undergraduate students with comprehensive learning and training opportunities in diverse areas in agriculture and food systems management enabling them to face the managerial challenges encountered locally and globally. The module provides the students with a greater opportunity to apply theoretical and practical knowledge to solve the problems in agricultural systems. Field exposure is an integral part of the module that enables undergraduate students to monitor and assess the issues in agricultural and food systems and apply appropriate management strategies to overcome them.

## DEPARTMENT OF AGRICULTURAL SYSTEMS

Name	Academic Qualifications	Position	Specialization
Prof. (Mrs.) G.A.S. Gimigaddara	BSc (Agric.) (Peradeniya, Sri Lanka) MPhil (Agric.) (Peradeniya, Sri Lanka) PhD (Agric. Syst. & Eng.) (AIT, Thailand)	Professor	Agricultural Systems Sustainable Agriculture Conservation Agriculture
Dr. (Mrs). S. N. Dissanayake	BSc (Agric.) (Peradeniya, Sri Lanka) MPhil (Agric. Econ.) (Peradeniya, Sri Lanka) PhD (Economics) (UQ, Australia)	Senior Lecturer	International Trade and Development Agricultural Policy Analysis Economics of Climate Change
Dr. A.M.K.R. Bandara	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (Bio-stat.) (Peradeniya, Sri Lanka) PhD (Peradeniya, Sri Lanka & Virginia Tech, USA)	Senior Lecturer	Linear, Nonlinear, Nonparametric and Semiparametric Regression Profile monitoring Timeseries modelling
Dr. A. P. S. Fernando	BSc (Agric.) (Rajarata, Sri Lanka) MPhil (Agric. Econ.) (Peradeniya, Sri Lanka) PhD (Agribusiness) (Massey, New Zealand)	Senior Lecturer	Agribusiness Entrepreneurship Agricultural Value Chains and Cooperatives
Dr. (Mrs). K. P. P. Kopyawattage	BSc (Agric. Tec. & Mgt.) (Peradeniya, Sri Lanka) MSc (Dev. Com & Extn.) (Peradeniya, Sri Lanka) PhD (Florida, USA)	Senior Lecturer	Agricultural Extension Adoption Behaviour Development Communication

## DEPARTMENT OF AGRICULTURAL SYSTEMS

Name	Academic Qualifications	Position	Specialization
Dr. S.M.C.B. Karaliyadda	BSc (Agric. Tec. & Mgt.) (Peradeniya, Sri Lanka) MSc (Org. Mgt.) (Peradeniya, Sri Lanka) MRD (Art and Economics) (Saga, Japan) PhD (Kagoshima, Japan) PQHRM (IPM, Sri Lanka)	Senior Lecturer	Organizational Management and Behaviour Human Ecology Conservation Behaviour
Mr. S.P. Dissanayake	BSc (Agric.) (Rajarata, Sri Lanka) MPhil (Peradeniya, Sri Lanka)	Lecturer (Prob.)	Agricultural Systems Sustainable Agriculture Conservation Agriculture
Mr. N.M.K.C. Premarathne	BSc (Agric. Tec. & Mgt.) (Peradeniya, Sri Lanka) MPhil (Reading) (Peradeniya, Sri Lanka) LL.B (Reading)(OUSL, Sri Lanka)	Lecturer (Prob.)	Natural Resource Economics Macroeconomics Econometrics
Mr. A.I.Y. Lankapura	BSc (Agric.) (Rajarata Sri Lanka) MSc (Reading) (Agric. Econ.)(Peradeniya, Sri Lanka) MPhil (Reading) (Rajarata, Sri Lanka)	Lecturer (Prob.)	Sustainable Community Development Climate Change and Development Project Management
Dr. L.P. Rupasena	BA (Economics)(Peradeniya, Sri Lanka) MSc (Agric. Econ.)(Pertanian, Malaysia) PhD (Agribusiness Mgt.) (UAS Dharward, India)	Senior Lecturer - Consultative	Agribusiness Management Project Management Econometrics

### 3. Department of Animal and Food Sciences

The Department of Animal & Food Sciences was established in 2014, with the vision to be a dynamic, innovative, and prestigious department for teaching, learning and research in the field of animal and food sciences. This is a full-fledged academic department comprised of diverse experienced academic staff with the mission to produce intellectuals who can contribute to the sustainable development of the animal and food sector of the country, through the facilitation of teaching, learning, research, and outreach activities across a wide range of disciplines.

Currently, the Department offers two specialization modules: Animal Production and Technology and Food and Postharvest Technology. The Animal Production and Technology module aims to provide students with knowledge and skills related to domesticated livestock production and aquaculture, and related technologies. The module on Food and Postharvest Technology is designed to develop the talents that are required to minimize food losses and spoilage while also promoting the value addition to commodities. Both modules provide comprehensive learning and training opportunities with field exposure which positions undergraduates exceptionally well for leading roles in non-state and the public sector in the areas of animal & food sciences. The multidisciplinary content of these modules enables undergraduates to develop communication, teamwork, values, and attitudes necessary to become the global citizen described in the graduate profile, enabling them to function on both the national and global scales.

## DEPARTMENT OF ANIMAL AND FOOD SCIENCES

Name	Academic Qualifications	Position	Specialization
Prof. A.M.J.B. Adikari	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (Dairying) (NDRI, India) PhD (Mol. Genet.) (Virginia Tech, USA)	Professor	Animal Genetics and Breeding
Prof. (Mrs.) W.A.D. Nayananjalie	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (Biotechnol.) (Peradeniya, Sri Lanka) PhD (Animal Sci.) (Virginia Tech, USA)	Professor	Animal Nutrition Ruminant Management
Prof. (Ms.) S. C. Somasiri	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (Peradeniya, Sri Lanka) MPhil (Peradeniya, Sri Lanka) PhD (Massey, New Zealand)	Professor	Animal Science Animal Feeding and Nutrition Livestock farming systems
Dr. (Mrs.) N.W.I.A. Jayawardana	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (Food and Nutrition) (Peradeniya, Sri Lanka) MPhil (Food and Nutrition) (Peradeniya, Sri Lanka) PhD (Nutritional Sci.) (Massey, New Zealand)	Senior Lecturer	Food Science & Technology Food and Nutrition
Dr. (Mrs.) R.H.G.R. Wathsala	BSc (Agric.) (Rajarata, Sri Lanka) M.Sc. (Animal Sci.) (Peradeniya, Sri Lanka) MSc (Marine Bio.) (UNINA, Italy) PhD (Earth, Life & Env. Sci) (UNIBO, Italy)	Senior Lecturer	Aquaculture and Fisheries Molecular Physiology

## DEPARTMENT OF ANIMAL AND FOOD SCIENCES

Name	Academic Qualifications	Position	Specialization
Mrs. C.A.K. Dissanayake	BSc (Agric.) (Peradeniya, Sri Lanka) MPhil (Peradeniya, Sri Lanka) PhD (Reading)	Senior Lecturer	Postharvest Technology Food Science
Dr. (Mrs.) D.W.M.M.M. Kumari	BSc (Agric. Tech. & Mgt.) (Peradeniya, Sri Lanka) MSc (Food Sci. & Tech.) (Peradeniya, Sri Lanka) PhD (Food Sci.) (UPLB, Philippines)	Lecturer	Food Science and Technology
Mrs. M.A.A.P. Kumari	BSc (Agric. Tech. & Mgt.) (Peradeniya, Sri Lanka) MSc (Aqua.) (Ghent, Belgium)	Lecturer	Poultry Management Meat Science
Mr. W.V.V.R. Weerasingha	BSc (Agric. Tech. & Mgt.) (Peradeniya, Sri Lanka) MSc (Food. Sci. & Tec.) (Peradeniya, Sri Lanka) MPhil (Reading) (Animal Sci.)	Lecturer (Prob.)	Dairy Science
Dr. H.R.M.G.C. Thilakarathna	BSc Food Sci. & Tech. (Sri Jayewardenepura, Sri Lanka) PhD (Food Sci. & Tech.) (Sri Jayewardenepura, Sri Lanka)	Lecturer (Prob.)	Food Science and Technology Postharvest technology

### 4. Department of Plant Sciences

The Department of Plant Sciences is committed to realize the vision of the faculty that is to be a dynamic, innovative, and renowned centre for excellence in Agriculture. The department offers courses on in fields of Crop Science and Agricultural Biology to produce competent and innovative graduates with a sound theoretical and practical knowledge in the agricultural sector with special emphasis on regional, national, and international needs.

The department is a gateway to specialize in sub-disciplines of Agronomy, Horticulture, Forestry, Field Crops, Plantation Crops, Biotechnology, Tissue Culture, Crop Protection, and Improvement. The graduates specialized in the department secure employment both in the private sector and public sector and many of them follow full-time postgraduate degrees. This has been made possible by the students in two specialization modules; Crop Science and Agricultural Biology, and sixteen-strong academic staff, of whom eight are Ph.D. holders. The department excels in teaching, research and innovation on Crop Sciences and Agricultural Biology.

In the Department of Plant Sciences, it is aimed to utilize up to date knowledge whenever possible for the betterment of both the students and academic staff. Our resources include a computer unit, plant tissue culture, entomology, plant pathology & agronomy laboratories, faculty farm field, protected agriculture facilities, mushroom unit, export agricultural garden, fruit orchard and medicinal garden. They allow the students to gain hands-on experience in the practical areas, parallel to the theoretical aspects connecting the classroom with the actual field scenarios.

Beyond theoretical framework, the department also conducts farmer days, farmer training programmes and awareness sessions which help in delivering new approaches of agriculture to the grass root level, providing solutions for the struggles faced by local farming communities, blending research knowledge with farmer proficiencies and providing opportunities for non-farming communities. Also, requisite programmes such as disease clinics have been conducted enabling farmers to pinpoint diseases in their crop lands, providing farmers an opportunity to share their experiences with professionals and awakening them to follow safety precautions and disease control measures. Through all these, the Department of Plant Sciences enables the students to pursue their own interests and succeed in the future careers through the coursework and research, while contributing to the betterment of the agriculture sector from the farmer level up to the national level, as well.

## DEPARTMENT OF PLANT SCIENCES

Name	Academic Qualifications	Position	Specialization
Snr. Prof. (Ms.) P.A Weerasinghe	MSc (Phytotechniques) (University of Nitra, Czechoslovakia) Ph.D. (Plant Tissue Culture) (University of Nitra, Czechoslovakia)	Senior Professor	Plant Tissue Culture Plant Physiology
Dr. D. M. D. Dissanayake	BSc (Agric.) (PFUR, Russia) MSc (Agric.) (PFUR, Russia) PhD (Peradeniya, Sri Lanka)	Senior Lecturer	Field Crop Agronomy Organic Agriculture Mushroom Culture
Dr. D.A.U.D. Devasinghe	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (Crop Sci.) (Peradeniya, Sri Lanka) PhD (Crop Sci.) (Peradeniya, Sri Lanka)	Senior Lecturer	Agronomy Horticulture Crop Production Protected Agriculture
Dr. W.C.P. Egodawatta	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (Bio-stat.) (Peradeniya, Sri Lanka) DSc (ETH Zurich, Switzerland)	Senior Lecturer	Tropical Crop Science Crop Physiology Agroecology
Dr. L.K.W. Wijayaratne	BSc (Agric.) (Ruhuna, Sri Lanka) MSc (Agric.) (Peradeniya, Sri Lanka) PhD (Entomology) (Manitoba, Canada)	Senior Lecturer	Stored-Product Entomology Pest Management Pheromone Biology
Dr. U.G.A.I. Sirisena	BSc (Agric.) (Rajarata, Sri Lanka) MSc (Plant Protec.) (Peradeniya, Sri Lanka) PhD (Peradeniya, Sri Lanka) Dip. (English) (Rajarata, Sri Lanka)	Senior Lecturer	Entomology Apiculture Pest Management
Mr. T. A. B. D. Sanjeewa	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (NRM) (Peradeniya, Sri Lanka) MPhil (Crop Sci.) (Peradeniya, Sri Lanka) PhD (Reading) (Peradeniya, Sri Lanka)	Senior Lecturer	Weed Science Vegetable Crop Production Medicinal Plants



## DEPARTMENT OF PLANT SCIENCES

Name	Academic Qualifications	Position	Specialization
Mr. M.C.M. Zakeel	BSc (Agric.) (Rajarata, Sri Lanka) MPhil (Agric. Bio.) (Peradeniya, Sri Lanka) PhD (Reading) (UQ, Australia)	Senior Lecturer	Biotechnology Agricultural Microbiology Plant Pathology & Host-Pathogen Interactions
Mrs. W.M.R.S.K. Warnasooriya	BSc (Agric.) (Peradeniya Sri Lanka) MSc (Crop Sci.) (Peradeniya, Sri Lanka) MPhil (Peradeniya, Sri Lanka)	Senior Lecturer	Plantation crops Plantation Forestry Climate Change Mitigation & Adaptation
Dr. Nalaka Geekiyanage	BSc (Agric. Tech. & Mgt.) (Peradeniya, Sri Lanka) MSc (Env. Forst.) (Peradeniya, Sri Lanka) DSc (Forest and Biomaterial Science) (Kyoto, Japan)	Senior Lecturer	Plant Functional Ecology Plant Ecophysiology Forest Restoration Ecology
Mrs. T. D. C. Priyadarshani	BSc (Agric. Tech. & Mgt.) (Peradeniya, Sri Lanka) MSc (Plant Protec.) (Peradeniya, Sri Lanka) MPhil (Plant Protec.) (Peradeniya, Sri Lanka)	Senior Lecturer	Plant Pathology Plant Disease Management
Dr. (Mrs.) K.R.E. Padmathilake	BSc (Agric.) (Peradeniya, Sri Lanka) MSc (Agric. Bio.) (Peradeniya, Sri Lanka) MSc (Cell bio.) (Waterloo, Canada) PhD (Plant Patho. (Manitoba, Canada)	Senior Lecturer	Plant Pathology Plant Physiology Biotechnology
Mrs. H.C.D. Wijayawardhana	BSc (Agric.) (Rajarata, Sri Lanka) MPhil (Agric. Bio.) (Peradeniya, Sri Lanka) MPhil (Reading) (Peradeniya, Sri Lanka)	Lecturer (Prob.)	Floriculture Biodiversity of Floral Crops Postharvest Horticulture
Ms. P.N.M.S. Piyarathne	BSc (Agric.) (Rajarata, Sri Lanka) MPhil (Reading) (Rajarata Sri Lanka)	Lecturer (Prob.)	Plantation Crops Export Agriculture Crops
Ms. U.S. Herath	BSc (Agric. Sci. & Mgt.) (Sabaragamuwa, Sri Lanka) MSc (Reading) (Peradeniya, Sri Lanka)	Lecturer (Prob.)	Crop Physiology Plant Abiotic Stress

**English Language Teaching Unit and Computer Centre**

<b>Name</b>	<b>Academic Qualifications</b>	<b>Position</b>	<b>Speciali- zation</b>
Mr. A.A.M. Nizam	BA (Lang.) (Sabaragamuwa, Sri Lanka) MA (Linguistics)(Kelaniya, Sri Lanka)	Lecturer	English
Mr. S.M.C. Bandara	BA (English) (Rajarata, Sri Lanka) MA (Linguistics) (Peradeniya, Sri Lanka) Dip. (English) (Rajarata, Sri Lanka)	Instructor	English
Mrs. E.D.T. Somarathna	BSc (Physical Sci.) (Peradeniya, Sri Lanka) MSc (Peradeniya, Sri Lanka)	Computer Instructor	Computer Technology

### 3.0 UNITS AND OTHER SERVICES

#### 3.1 English Language Teaching Unit (ELTU)

The English Language Teaching Unit (ELTU) was established along with the establishment of the Faculty of Agriculture in 2001. The unit offers a short intensive course for new entrants and curriculum embedded courses. These courses are compulsory for all undergraduates.

The ongoing courses of English in each semester comprise three components: Language structure, Reading & writing and Oral (Listening and Speech).

The English Language Laboratory, which comes under the ELTU was inaugurated in year 2007, which is equipped with state-of-art technology including computers and audio-visual facilities for students to uplift their knowledge and skills in English.

#### 3.2 Computer Centre

The faculty Computer Centre provides services including free internet access to both students and staff of the Faculty of Agriculture. It consists of a local area network with microcomputers and a file server. Two basic computer-courses are offered to undergraduates during the first year of the degree programme. Students have the accessibility to utilize resources in the computer centre at any time for their studies during the undergraduate period.

#### 3.3 Agriculture Library

The library of the Faculty of Agriculture was established in year 2001. It is rich in a collection of most essential textbooks, to cover all subject areas pertaining to agriculture, physical education, computer science, literature, English, history, and books for general reading. Library also comprises of a well-organized collection of Periodicals, Encyclopaedias, Dictionaries, Year books and Handbooks in Agriculture.

Books in the library are arranged according to subject order using the DDC classification system and are formed in a numerical sequence. Bibliographic information on the whole collection of the library is stored in the computer database to assist users. The library has the membership of the agriculture information network (AGRINET) to share the information thorough the library repository and also included to the inter-library loan services. All borrowed library materials should be returned to the library at the time of completion of the degree programme to receive the degree certificate.

#### 3.4 Faculty Farm

The faculty farm is located closer to the faculty main premises at Puliyankulama which is mainly used for student training programmes in crop production, animal production and for research work of students and academic staff. Faculty farm also provides beneficial influence to uplift the knowledge on farming activities of neighbouring farmers to favour the dissemination of agricultural knowledge in wider community. At present, lowlands are used for seed paddy production, while uplands are allocated for medicinal gardening, orchards, protected culture and pasture. Livestock section includes poultry, cattle, buffalo, goat, sheep, rabbit, and miscellaneous poultry units. In addition, duck and fish integration unit and biogas production unit are maintained. Eggs, chicken meat, yoghurt, curd, and ice cream are produced as livestock products. Seed paddy, mushroom, vegetables, and fruits are other farm products available seasonally. The management of the farm is under the supervision of the farm manager. The assistant farm manager, field supervisor and farm staff are supporting the Farm Manager to maintain the farm as a commercial venture.

### 3.5 Sports Facilities

Physical training has been identified by the faculty as an essential component in the academic career of the students. The faculty provides necessary facilities including indoor gymnasium for the students to involve in physical training activities. Sports equipment are provided by the Department of Physical Education of the University. A Physical Education Instructor is available to assist the students in their sports activities. Sports events such as inter-university, inter-faculty, and inter-agriculture faculty are organized annually.

### 3.6 Health Care

Outpatient treatments are available through a visiting medical officer who visits the faculty twice a week. Those who need in-house treatment are referred to the Teaching Hospital at Anuradhapura.

### 3.7 Student Counselling

The counselling unit at the faculty guides the students in personality development, handling health care and coping with psychological problems. To achieve this task effectively, faculty utilizes the services of trained student counsellors appointed from among the senior academic staff of the faculty.

### 3.8 Faculty Career Guidance Unit

Faculty career guidance unit, located in the faculty premises, guides students in developing their personality and planning their career paths and job shadowing activities. Workshops, seminars, and other career guidance activities are organized by the Academic Counsellor in Career Guidance to fulfil this task mainly in connection with main Career Guidance Unit located at Mihintale premises. In addition, regular soft skill development camps for students are conducted by trained academic staff of the faculty.

### 3.9 Faculty Outreach Centre

The faculty outreach centre was established in year 2011 and plays a major role in community development programmes in the region and beyond. Programmes are conducted smoothly through the centre, in a sustainable way with the participation of students, academic staff and community.

### 3.10 Technology Incubation Centre (TIC-RUSL)

The Technology Incubation Centre (TIC-RUSL) was established in 2021 at the Faculty of Agriculture, RUSL in collaboration with the Sri Lanka Inventors Commission of the Ministry of Science, Technology and Research for the transformation of invention into innovation. Functions of the TIC-RUSL are to, Provide technical support to inventors for the development of their inventions as commercial products; Support inventors to start-up business as self-employers; Build a vibrant network of inventors, experts, investors and policymakers forming a platform for successful entrepreneurship; Provide to undergraduates/postgraduates to interact with inventors Develop invention culture in the university and the society; Strengthen relationships between the university and community, industry and policymakers

Activities of the TIC-RUSL are to, Study market requirements and providing consultancy on product marketing; Provide technical knowledge and business skills to the inventors; Support to develop business plans with Return on Investment (ROI); Conduct workshops, seminars and training programmes; Link inventors to the ministries, government agencies and non-government organizations including banks to obtain the required servers; Provide an opportunity to the undergraduates/postgraduates to exchange knowledge and experience with inventors; Advice on issues related to Intellectual Property (IP).

## **4.0 ADMISSION REQUIREMENTS**

### **4.1 Local entrants**

In order to be eligible for admission to the Faculty of Agriculture, a candidate should have obtained at least “S” Grade passes for three subjects in one sitting from any of the following combinations at the G.C.E. (A/L) examination.

- (I) Chemistry, Physics and Biology
- (ii) Chemistry, Physics or Mathematics, Biology or Agricultural Science
- (iii) Chemistry, Biology, Agricultural Science or Mathematics

### **4.2 International entrants**

Candidates with impressive results of an examination deemed equivalent to G.C.E (Advanced Level) Examination of Sri Lanka are eligible to apply for admission to the faculty through University Grants Commission of Sri Lanka (<http://www.ugc.ac.lk>).

## 5.0 COURSE OUTLINE

## B.Sc. AGRICULTURE DEGREE (CORE PROGRAMME)

Year 1 Semester 1			Year 1 Semester 2		
Course Code	Course Title	Course Code	Course Title	Course Code	Course Title
ES	1101 (2/20:20)	Analytical Chemistry	ES	1201 (2/15:30)	Introductory Soil Science
ES	1102 (2/25:10)	Engineering Physics**	ES	1202 (2/25:10)	Soil-Plant-Water Dynamics
ES	1103 (2/25:10)	Farm Power Engineering	AS	1201 (2/25:10)	Principles of Entrepreneurship and Agribusiness
ES	1104 (2/25:10)	Hydrology and Climatology	AF	1201 (2/25:10)	Anatomy and Physiology of Farm Animals
AS	1101 (2/30:00)	Basic Mathematics**	AF	1202 (2/25:10)	Animal Nutrition and Feeding
AS	1102 (2/25:10)	Fundamentals of Organizational Management and Behaviour	AF	1203 (2/20:20)	Biochemistry
AF	1101 (2/25:10)	Introduction to Animal Production and Aquaculture	PS	1201 (2/15:30)	Principles of Horticulture
PS	1101 (2/25:10)	Principles of Agronomy	PS	1202 (2/20:20)	Principles of Entomology
PS	1102 (2/20:20)	Plant Systematics	PS	1203 (2/20:20)	Plant Physiology
EG	1101 (2/15:30)	General English I**	EG	1201 (2/15:30)	General English II**
IT	1101 (2/15:30)	Information and Communication Technology I**	IT	1201 (2/15:30)	Information and Communication Technology II**

*Subjects superscripted with \*\* denote that they are credited and not contributing to the GPA*

Year 2 Semester 1			Year 2 Semester 2		
Course Code	Course Title	Course Code	Course Title	Course Code	Course Title
ES	2101 (2/25:10)	Agricultural Mechanization & Automation	ES	2201 (2/25:10)	Irrigation and Water Management
ES	2102 (2/20:20)	Soil Health and Fertility Management	AS	2201 (2/25:10)	Applied Farming Systems
AS	2101 (2/25:10)	Agricultural Communication	AS	2202 (2/30:00)	Experimental Methods in Agricultural Research
AS	2102 (2/30:00)	Basic Statistics	AS	2203 (2/25:10)	Principles of Agri-food Marketing
AS	2103 (2/25:10)	Principles of Economics	AF	2201 (2/25:10)	Ruminant Management
AF	2101 (2/25:10)	Poultry and Swine Production	AF	2202 (2/25:10)	Principles of Postharvest Technology
AF	2102 (2/25:10)	Principles of Food Science and Technology	PS	2201 (2/30:00)	Field Crop Production
PS	2101 (2/25:10)	Perennial Crop Production I: Tea and Rubber	PS	2202 (2/25:10)	Perennial Crop Production II: Coconut, Spice and Beverage Crops
PS	2102 (2/25:10)	Commercial Horticulture	PS	2203 (2/25:10)	Forest Ecosystems Management
PS	2103 (2/25:10)	Genetics and Plant Breeding	PS	2204 (3/30:30)	Agricultural Microbiology and Phytopathology
EG	2101 (2/15:30)	English Language for Higher Education	CC	2201 (2/20:20)	Career Development

Year 3 Semester 1		
Course Code	Course Title	Course Title
ES	3101 (2/15:30)	Engineering Drawing and Land Survey
ES	3102 (3/00:135)	Field Practices in Agricultural Engineering and Soil Science
ES	3103 (1/00:30)	Operation and Maintenance of Two-wheel and Four-wheel Tractors
AS	3101 (2/15:45)	Community Development and Developmental Extension
AS	3102 (2/15:30)	Farm Finance and Resource Management
AF	3101 (3/00:135)	Practical Animal Production
AF	3102 (1/00:30) **	Training on Postharvest Technology of Agricultural Food Crops
PS	3101 (5/15:180)	Crop Production and Management Technologies
PS	3102 (2/15:30)	Pest and Disease Management

Subjects superscripted with \*\* denote that they are credited and not contributing to the GPA

## 5.1 COURSE CAPSULES

### 5.1.1 Department of Agricultural Engineering and Soil Science

#### **ES 1101 (2/20:20:60) Analytical Chemistry**

Analytical chemistry and its relevance to agricultural science; Laboratory safety; Terminology and basic concepts of analytical chemistry; Qualitative and quantitative analysis; Standard solutions; Stoichiometry; Redox reactions; Acidity and alkalinity; Volumetric analysis; Gravimetric analysis; Principles and applications of major analytical instruments.

#### **ES 1102 (2/25:10:65) Engineering Physics**

Units and measurements; Dynamics: kinematic equations, vectors and scalars, force, mass, work, energy, linear momentum; Static equilibrium: torque, Lami's theorem; Heat: specific heat, latent heat, heat transfer; Thermodynamics: zeroth law, first law, second law and applications; Fluids: density and specific gravity, pressure in fluids, continuity equation for fluids; Waves: electromagnetic spectrum, applications in agriculture.

#### **ES 1103 (2/25:10:65) Farm Power Engineering**

Sources of farm power: human power, animal power, mechanical power, electrical power, renewable energy; Principles of power transmission; Farm tractors: tractor performances; Internal combustion engine: two-stroke and four-stroke engines, engine systems.

#### **ES 1104 (2/25:10:65) Hydrology and Climatology**

Hydrological cycle; Precipitation; Interception; Infiltration; Evaporation; Runoff; Hydrograph analysis; Unit hydrograph; Stream flow measurements; Hydrological modelling; Introduction to climatology; Elements of weather and climate; Structure and composition of the atmosphere; Insolation and energy balance; Atmospheric parameters; Clouds; Evolution of climatic zoning in Sri Lanka; Climate of Sri Lanka; Climate variability and change; Weather forecasting; Climate modelling.

#### **ES 1201 (2/15:30:55) Introductory Soil Science**

Introduction to soil science; Formation of rocks and minerals; Physical properties of minerals; Rock cycle in nature; Weathering of rocks and minerals; Factors and processes of soil formation; Soil profile; Soil physical properties and characteristics: structure, texture, mass volume relationship, colour, consistency, aggregate stability; Soil chemical properties and characteristics: acidity, alkalinity, electrical conductivity, cation exchange capacity, organic matter; Soil biological properties and characteristics; Introduction to soils of Sri Lanka.

#### **ES 1202 (2/25:10:65) Soil-Plant-Water Dynamics**

Soil properties influencing water relationships: soil texture, soil structure, soil compaction, soil consolidation; Soil water dynamics: soil-water potential, soil moisture interpretation, soil moisture constants, water movements in soil, soil water intake; Plant-water relationship: factors affecting absorption, conduction and transpiration of water, critical moisture stages, moisture extraction patterns of different root systems; Water requirements of crops: evapotranspiration, measurements and estimations.

#### **ES 2101 (2/25:10:65) Agricultural Mechanization & Automation**

Mechanization: evolution of mechanization, appropriate mechanization; Automation; Indigenous farm technology and advancements; Safety in agricultural operations; Tillage; Farm machinery: land preparation equipment, crop establishment machinery, cultivators, chemical application machinery, water lifting devices, performance of farm machinery, harvesting and post-harvest machinery, machinery for livestock and plantation.

#### **ES 2102 (2/20:20:60) Soil Health and Fertility Management**

Introduction to soil fertility and health; Factors governing soil fertility and their importance; Plant nutrients and their classification; Nutrient dynamics in soil; Nutrient uptake by plants; Fertilizers and soil amendments; Organic manure and bio fertilizers; Fertilizer application techniques; Site-specific and integrated nutrient management; Assessment of soil health; Introduction to problem soils in Sri Lanka.



**ES 2201 (2/25:10:65) Irrigation and Water Management**

Introduction to irrigation systems in Sri Lanka; Irrigation methods: surface irrigation, subsurface irrigation, pressurized irrigation; Measurement of irrigation water; Irrigation scheduling; Irrigation efficiency; Drainage; Irrigation wells; Recent advances in irrigation and water management.

**ES 3101 (2/15:30:55) Engineering Drawing and Land Surveying**

Engineering drawing: introduction to manual drafting equipment, geometrical constructions, orthographic drawings, first angle and third angle projection methods, isometric drawing, detailing of mechanical and civil engineering drawing; Land surveying: introduction to land surveying techniques and its applications in agriculture, principles in land surveying, distance measurements, techniques in chain surveying, plane table surveying techniques, measurements of angles and bearings, differential and profile levelling techniques.

**ES 3102 (3/00:135:15) Field Practices in Agricultural Engineering and Soil Science**

Maintenance of farm tractor; Farm machinery performances; Identification, usage, maintenance and troubleshooting of farm machinery, calibration of farm machinery; Assessment of quality of the tilled soil; Assessment of grain physical properties; Installation and operation of centrifugal pump; Irrigation scheduling; Interpretation of meteorological data; Estimation of soil hydraulic parameters; Irrigation and drainage systems; Water harvesting techniques; Site-specific nutrient recommendation; Field tests for slaking, consistency, aggregate stability and dispersion of soil, field observations for nutrient deficiencies; Soil microbial determinations; Soil health assessments; Soil profile study in a soil catena; On-farm soil and water conservation.

**ES 3103 (1/00:30:70) Operation and Maintenance of Two-wheel and Four-wheel Tractors**

Introduction to two- & four-wheel tractors; Engine system; Daily maintenance practices and routing maintenance practices of two- & four-wheel tractors; Upland and field manipulation of two- & four-wheel tractors; Tractor attachments; Field operations.

**5.1.2 Department of Agricultural Systems**

**AS 1101 (2/30:00:65) Basic Mathematics**

Introduction to functions and their graphs; Introduction to coordinate geometry: line, functions of parabola and circle; Introduction to sets theory; Introduction to probability; Introduction to trigonometric functions; Introduction to calculus: limits and continuity, rules of differentiation; Differentiation of algebraic and logarithmic functions; Differentiation of trigonometric functions; Introduction to integration; Integration of different functions; Application of differentiation and integration; Introduction to matrix algebra; Solving linear equations.

**AS 1102 (2/25:10:65) Fundamentals of Organizational Management and Behaviour**

Key functions of management; Responsibilities and roles of management; Managing people in organization; Managing time in organizations; Leadership development, teamwork, power and decision-making; Inter- and intra-group dynamics; Conflict and change management in organizations; Motivation of employees; Organizational communication; Quality management; Ethics in organizational management.

**AS 1201 (2/25:10:65) Principles of Entrepreneurship and Agribusiness**

Introduction to entrepreneurship; Characteristics of entrepreneurs; Proprietary and corporate entrepreneurs; Role of entrepreneurs in creating country's wealth; Introduction to different business enterprises; Identifying entrepreneurial opportunities in agriculture; Development of agribusiness models; Competitive strategy and value proposition; Financing; Analysis and control of businesses; Managing growth.

**AS 2101 (2/30:00:70) Basic Statistics**

Introduction to scale of measurements; Introduction to population, sample and sampling methods; Graphical methods of data presentation: frequency distribution, histograms, stem and leaf plots, box plots; Numerical methods of data presentation; Measures of central tendency and dispersion; Concept of probability: probability distributions, distribution of sample mean; Principles of hypothesis testing; Estimation tests, one sample and two sample t-tests; Introduction to simple linear regression and correlation; Introduction to analysis of variance.

**AS 2102 (2/25:10:65) Principles of Economics**

Thinking like an economist; Introduction to economics, microeconomic concepts, and analysis; Theory of consumer behaviour; Consumer demand; Theory of producer behaviour; Theory of supply; Theory of markets; Government intervention; Fundamentals of macroeconomics; National income calculation, aggregate demand, and aggregate supply model.

**AS 2103 (2/25:10:65) Agricultural Communication**

The history, development and future of agricultural information dissemination, Agricultural information and knowledge dissemination models and approaches; Agricultural communication: individual, group and mass contact methods; Disseminating information for rural and national development; Designing, teaching and training aids and materials; Assessment of target group needs; Rapid and participatory rural appraisal; Agricultural extension institutes; Issues and trends in agricultural information dissemination.

**AS 2201 (2/25:10:65) Applied Farming Systems**

Systems concept; System approach to agriculture; Types, classification, and characteristics of farming systems; Farming systems in Sri Lanka; Interactions among different components of farming systems; Evaluation of farming systems; Introduction to farming system research and development (FSR) methodology.

**AS 2202 (2/30:00:70) Experimental Methods in Agricultural Research**

Introduction to principles of experiment design; Complete block designs, CRD, RCBD, LSD; Mean comparison methods; Concepts and application of covariance analysis; Introduction to factorial experiments, designing and analysis of two factor and three factor experiments; Compounding in factorial experiments; Designing and analysis of fractional factorial experiments.

**AS 2203 (2/25:10:65) Principles of Agri-food Marketing**

Evolution of marketing and marketing of agri-food products; Core concepts; Marketing philosophies; Marketing environment; Functions of agricultural marketing; Marketing efficiency; Marketing mix for agricultural products; Product life cycle; Market segmentation, targeting, and positioning; Consumer buying behaviour; Organization, operation and performance of agricultural product and food marketing in Sri Lanka; Introduction to marketing research.

**AS 3101 (2/15:45:40) Community Development and Developmental Extension**

Rural communities and the concept of developmental extension; Concept of family farming; Community development approaches; Adult education; Adoption and diffusion of agricultural innovations; Client/customer relationship in agricultural work; Community-based organizations; Agricultural information and management; Developing innovation capabilities in farmer organizations; New trends in agricultural extension; Extension programme planning; Market oriented extension services, Development of extension programmes.

**AS 3102 (2/15:30:55) Farm Finance and Resource Management**

Introduction to production and cost economic concepts; Review of basic calculus; Production functions; Law of diminishing marginal returns; Optimum input and output levels; Factor-factor relationship; Product-product relationship; Cost function; Profit maximization; Farm management economics; Record keeping; Introduction to farm planning and budgeting; Investment analysis; Decision making under risk and uncertainty; Overview of computer-based techniques for farm management.

**5.1.3 Department of Animal and Food Sciences**

**AF 1101 (2/25:10:65) Introduction to Animal Production and Aquaculture**

Introduction to animal production and present status; Characteristics of common breeds of farm animals; Farm animal–environment interactions; Principles of genetics and breeding of farm animals; Principles of housing, feeding and general management of farm animals; Farm animal health management; Components of a small scale integrated farm; Introduction to aquaculture and fisheries; Fishery potentials of Sri Lanka; Biology of aquaculture species; Identification of aquaculture species; Husbandry of key aquaculture species; Types and systems of aquaculture; Sustainable aquaculture.

**AF 1201(2/25:10:65) Anatomy and Physiology of Farm Animals**

Introduction and terminology; Anatomy and physiology of digestive, reproductive, mammary, nervous, endocrine systems of farm animals; Oestrous cycle and its manipulation of farm animals; Anatomy and physiology of finfish.

**AF 1202 (2/25:10:65) Animal Nutrition and Feeding**

Introduction; Importance of nutrients to farm animals; Classification of feeds, dry roughages, legumes (pasture & fodder), non-leguminous grasses & fodder, concentrates, feed additives; Estimation of feed quality (proximate analysis); Basic steps in ration formulation; Forage establishment, management, and defoliation practices; Forage yield estimation; Forage conservation; Anti-nutritive factors of forages.

**AF 1203 (2/20:20:60) Biochemistry**

Introduction; Classification, structure, properties and functions of carbohydrates, proteins, lipids, nucleotides, and enzymes; Metabolism of carbohydrates, proteins, and lipids; Quantitative and qualitative tests for carbohydrates, proteins, and lipids.

**AF 2101 (2/25:10:65) Poultry and Swine Production**

Introduction; Poultry genetics; Incubation of eggs; Brooding management; Management of different production groups of poultry; Poultry welfare; Common diseases of poultry and prevention; Management of different production groups of swine; Composition of a swine herd; Components of a swine farm; Common diseases of swine and prevention; Swine welfare.

**AF 2102 (2/25:10:65) Principles of Food Science and Technology**

Introduction; Food constituents, their properties, and nutritional aspects; Unit operations in the food industry; Food spoilage and food safety; Food processing and preservation techniques; Principles of food packaging; Principles of human nutrition and common nutritional problems.

**AF 2201 (2/25:10:65) Ruminant Management**

Introduction to the dairy industry; Management of dairy calves, heifers, dairy cows, bulls, and dry cows; Milking process; Beef industry; Buffalo management; Common diseases and prevention; Small ruminant industries; Farm animal welfare issues related to dairy farming.

**AF 2202(2/25:10:65) Principles of Postharvest Technology**

Introduction; Food losses and pre-harvest management of crops; Postharvest technology of fruits and vegetables: postharvest physiology, quality, and maturity evaluation, packhouse operations; Postharvest technology of cereals and legumes: harvesting, threshing, and cleaning, principles of drying and storage, psychometric process and its applications, grain processing technology, stored product pest management.

**AF 3101 (3/00:135:15) Practical Animal Production**

Management practices of poultry, cattle, buffalo, goat, sheep, and swine; Inland and ornamental fish farming; Establishment and conservation of fodder and pasture; Meat and milk processing; Production of animal-derived food products; Quality evaluation of meat and dairy products.

**AF 3102 (1/00:30:70) Training on Postharvest Technology of Agricultural Food Crops**

Postharvest losses and causative factors; Quality parameters and control measures, sampling techniques and analysis; Primary processing and machinery involved in grains: harvesting, threshing, cleaning, drying, rice milling; Grain storage: pest control, warehouse management; Fresh fruits and vegetables: harvesting, sorting, grading, packaging, transportation, packhouse operations, storage; Postharvest disease management; Secondary processing: grain flour and other value-added products, value-added products from fruits and vegetables, food packaging.

(The students are required to be present for one-week training at the National Institute of Post-Harvest Management, Anuradhapura).

**5.1.4 Department of Plant Sciences****PS 1101 (2/25:10:65) Principles of Agronomy**

Agriculture, agronomy, and environment; Evolution of agriculture; Climate and crop production; Agro-ecology of Sri Lanka; Tillage and crop establishment; Nutrients in agriculture; Fertilizers and their management; Weed biology and management; Crop growth analysis; Management of fluxes; Concepts of sustainability; Ecology of crop production.

**PS 1102 (2/20:20:60) Plant Systematics**

Plant taxonomy, systems, and morphology; Botanical nomenclature and taxonomic hierarchy; Botanical terminology; Morphology of field crops, vegetables (Family: Poaceae, Fabaceae, Cucurbitaceae, Solanaceae), plantation crops (Family: Theaceae, Rubiaceae, Euphorbiaceae, Malvaceae, Arecaceae), spices (Family: Myrtaceae, Myristicaceae, Piperaceae, Zingiberaceae, Lauraceae, Orchidaceae), fruit crops (Family: Musaceae, Rutaceae, Bromeliaceae, Caricaceae, Anacardiaceae).

**PS 1201 (2/15:30:55) Principles of Horticulture**

Introduction to horticulture; Classification of horticultural crops; Plant propagation: sexual, asexual; Quality parameters of seeds: germination, vigour, purity, moisture content, phytosanitary attributes; Seed viability; Seed dormancy; Seed treatments; Growing media; Nursery management; Training and pruning; Application of growth regulators; Introduction to landscape gardening; Introduction to protected agriculture; Harvest and postharvest handling of horticultural products.

**PS 1202 (2/20:20:60) Principles of Entomology**

Introduction to entomology; Importance of insects, evolution of insects, insect diversity and abundance, external morphology of insects and their relatives; Head capsules, mouthparts, antennae, legs, wings, abdomen, and their modifications; Anatomy and physiology of digestive, excretory, nervous, respiratory, and reproductive systems; Insect cuticle and metamorphosis, post-embryonic development of insects; Insect taxonomy and classification; Overview of economically important orders of insects.

**PS 1203 (2/20:20:60) Plant Physiology**

Introduction to plant physiology; Water balance of plants; Solute transport; Photosynthesis: light reactions, carbon reactions, physiological and ecological considerations; Phloem translocation; Plant respiration: glycolysis, oxidative pentose phosphate pathway, citric acid cycle; Application of respiratory processes in growth and maintenance; Secondary metabolites and plant defence; Phytochromes: light control of flowering, plant development; Responses and adaptations to biotic and abiotic stresses.

**PS 2101 (2/25:10:65) Perennial Crop Production I: Tea and Rubber**

Tea and Rubber: Overview, climate, soil, and their influence on yield; Cultivar recommendations; Nursery management as a commercial venture; Land preparation, crop establishment and crop management for sustainability; Harvesting for yield optimization; Processing and value addition; Institutional support.

**PS 2102 (2/25:10:65) Commercial Horticulture**

Present status and future scope of fruit and ornamentals production; Fruit crops: varieties, ecological requirements; Good agricultural practices: banana, mango, papaya, pineapple, grapes, oranges, avocado, dragon fruit, guava, pomegranate; Underutilized fruits; Orchard management; Ornamental plants: anthurium, orchids, roses, foliage plants, turfgrass; Management of ornamental plants: propagation, establishment, maintenance, harvesting, postharvest techniques.

**PS 2103 (2/25:10:65) Genetics and Plant Breeding**

Genetic basis of inheritance; Non-Mendelian chromosomal inheritance; Principles of cytogenetics; Linkage and crossing over; Mutation; Introduction to population genetics; Reproductive biology of crops; Introduction to plant breeding; Breeding objectives of crop improvement; Breeding methods: self-pollinated, cross-pollinated and clonally propagated crops; Breeding hybrid cultivars; Molecular breeding techniques; Plant genetic resources and conservation.

**PS 2201 (2/30:00:70) Field Crop Production**

Introduction to field crop production; Field crops and their role: global and local crop production, yield and yield gap; Field crops: rice, upland cereals, pulses, oil crops, root and tuber crops, sugarcane, condiments, fibre crops, tobacco; Agronomy: agro-ecology, land preparation, varieties, nurseries & crop establishment, management; Harvesting and postharvest management; Field crop-based cropping systems.

**PS 2202 (2/25:10:65) Perennial Crop Production II: Coconut, Spice and Beverage Crops**

Coconut, Spice and Beverage crops: overview, climate, soil, and their influence on yield; Varietal recommendation; Nursery management as a commercial venture; Land preparation, crop establishment and crop management for sustainability; Harvesting for yield optimization; Processing & value addition; Institutional support.

**PS 2203 (2/25:10:65) Forest Ecosystems Management**

Introduction to forest ecosystems; Forest degradation and deforestation; Classification and characteristics of earth's biosphere; Biotic interactions in forest ecosystems and their resilience; Ecosystem services and roles of forests; Floristic regions and natural ecosystems of Sri Lanka; Diversity of flora & fauna of Sri Lanka; Man-made ecosystems of Sri Lanka; Impacts of global climate change on forest ecosystems and climate emergency; Sustainable management of forest ecosystems; Agroforestry for managing man-made ecosystems; Governance of forest ecosystems in Sri Lanka.

**PS 2204 (3/30:30:90) Agricultural Microbiology and Phytopathology**

Economic significance of microbiology in agriculture; Classification of microorganisms; Microbial identification: morphology, structure and functions of bacteria, fungi, virus and bacteriophages; Microbial nutrition; Microbial growth; Microbes in air, water and soil; Biological nitrogen fixation; Mycorrhizal symbiosis; Techniques used in microbial control; History and significance of phytopathology; Plant disease cycle; Plant disease triangle; Plant defence mechanisms against pathogens: structural and biochemical defence mechanisms; Diagnosis of plant diseases and disorders based on symptomatology.

**PS 3101 (5/15:180:55) Crop Production and Management Technologies**

Olericulture: agro-ecological requirements, agronomy, seed production and improvement; Practical aspects of crop production: varieties, nursery techniques, land preparation, establishment, management, harvesting of field crops and vegetables; Practicum in plant protection: identification of weeds, pests and diseases, handling of pesticides, integrated pest management.

**PS 3102 (2/15:30:55) Pest and Disease Management**

Pest population dynamics and pest status; Pest management: elements, principles; Pests & diseases of rice, other cereals, pulses, oil crops, condiments, vegetables, fruit crops, ornamental plants; Post-harvest pests & diseases; Pest management methods: cultural, physical, mechanical, biological, regulatory; Integrated pest management; Plant disease management strategies; Integrated disease management.

**5.1.5 English Language Teaching Unit (ELTU)****EG 1101 (2/15:30:55) General English I**

Vocabulary: phrasal verbs, everyday expressions, confusing words; Grammar: simple present tense, “be” and “have” as full verbs, prepositions, present continuous tense, present perfect tense, present perfect continuous tense; Writing: paragraphs, notes, letters; Reading: comprehension, scanning; Speaking: social English, communicative activities, simulation, talking about one's family; Listening: extracting specific information, facts and figures, identifying, and understanding key ideas.

**EG 1201 (2/15:30:55) General English II**

Vocabulary: words often misused, expressions with “do” and “make”; Grammar: simple past tense, past continuous tense, past perfect tense, conditional sentences; Writing: notices, formal letters; Reading: comprehension, scanning, skimming, making inferences; Speaking: requesting a favour, granting a request, declining a request, decision making activity, asking for directions and giving directions, taking part in discussions; Listening: extracting specific information, taking down telephone messages, identifying and understanding key ideas, extracting required information from conversations, following instructions, getting the gist of a text.

**EG 2101 (2/15:30:55) English Language for Higher Education**

Language structures and construction: tenses, voice, speech; Academic writing for higher education: academic essays, report writing, summarizing, synthesizing and sequential organization of ideas for argument and presenting claims; Reading comprehension in academic English; Speaking skills for academic communication; Listening skills for academic interactions.

**EG 4101 (2/15:30:55) English for Employment**

Effective communication in the workplace; Grammar for business communication; Listening comprehension; Reading comprehension; Writing skills for the workplace; Spoken skills for the workplace.

### 5.1.6 Computer Centre

#### **IT 1101 (2/15:30:55) Information and Communication Technology I**

Basic Concepts of ICT, Computers and computer system; Introduction to word processing; Getting started with Microsoft Word; Adjusting environment settings; Formatting of text, symbols and paragraphs; Working with equation editor, tables, graphics and charts; Use of mail merge; Setting up pages and printing; Creating references within documents; Document comments and track changes; Introduction to electronic presentation; Getting started with MS PowerPoint; Modifying and formatting presentations; Working with drawings, graphics and charts; Setting up presentation slides and printing; Internet and e-mail; Benefits, security and risks in Internet; E-learning.

#### **IT 1201 (2/15:30:55) Information and Communication Technology II**

Introduction to spreadsheet management; Getting started with Microsoft Excel; Basic file operations; Adjusting environment settings; Formatting cells and worksheets; Working with functions; Formatting/modifying charts; Setting up sheets and printing, Introduction to database management; Getting started with Microsoft Access; Planning and creating databases; Creating/modifying tables; Creating queries; Designing forms; Designing reports, Relationships between database objects.

### 5.1.7 Common Courses

#### **CC 2201 (2/20:20:60) Career Development**

Introduction to career development; Knowing yourself; Explore my career opportunities; Career planning; Job seeking; The road map for successful career; Career portfolio development; Personal branding; Creating my future.

**6.0 COURSE OUTLINE B.Sc. AGRICULTURE DEGREE (SPECIALIZATION PROGRAMME)**

Courses offered during the Specialization by four departments are listed below. For each of the Specialization module, students are required to register for a minimum of 18 credits in year 3 semester 2 and six (6) credits in year 4 semester 1, including all compulsory courses listed under respective modules. During year 4 semester 1, students are required to undergo a three-month training in a selected industry, which carries two (2) credits. During year 4 semester 2, students are required to undertake a research project under the guidance of a supervisor, which carries six (6) credits.

Year 3 Semester 2					
Course Code		Course Title		Course Title	
<b>Department of Agricultural Engineering and Soil Science</b>					
ES	3201 (2/25:10)	Agricultural Engineering Systems Design and Construction	ES	3212 (2/20:20)	Rice Soil Management
ES	3202 (2/25:10)	Climate Change and Environmental Sustainability	ES	3213 (2/25:10)	Soil and Ecosystems
ES	3203 (2/00:60)	Computer Programming and Engineering Graphics Design	ES	3214 (2/20:20)	Soil Microbiology
ES	3204 (2/25:10)	Food Process Engineering	ES	3215 (2/20:20)	Soil Survey and Classification
ES	3205 (2/15:30)	Innovation and Product Development	ES	3216 (2/20:20)	Soils of Sri Lanka
ES	3206 (2/25:10)	Integrated Management of Water Resources in Sri Lanka	ES	3217 (2/20:20)	Sustainable Land Use Planning for Agriculture
ES	3207 (2/15:30)	Irrigation Engineering	ES	3218 (2/20:20)	Sustainable Soil Management in Agriculture
ES	3208 (2/25:10)	Mechatronics and Precision Agriculture	ES	3219 (2/25:10)	Thermodynamics
ES	3209 (2/15:30)	GIS and Remote Sensing	ES	3220 (2/20:20)	Waste Management
ES	3210 (2/25:10)	Renewable Energy Technology and Management	ES	3221 (2/15:30)	Water Quality Assessment and Modelling
ES	3211 (2/20:20)	Management of Degraded Lands	ES	3222 (2/25:10)	Watershed Management and Modelling



<b>Department of Agricultural Systems</b>					
AS	3201 (2/25:10)	Applied Econometrics	AS	3214 (2/25:10)	Rural Sociology
AS	3202 (2/25:10)	Extension Education	AS	3215 (2/15:30)	Time Series Data Analysis
AS	3203 (2/25:10)	Food Value Chain Analysis	AS	3216 (2/25:10)	Climate Smart Agricultural Systems
AS	3204 (2/15:30)	Industrial English **	AS	3217 (2/20:20)	Food Security Assessment
AS	3205 (2/20:20)	Project Management	AS	3218 (2/25:10)	Global Food Systems
AS	3206 (2/20:20)	Social Research Methodology	AS	3219 (2/25:10)	Evolution of Technologies in Agricultural Systems
AS	3207 (2/20:20)	Agricultural Development and Policy	AS	3220 (2/20:20)	Sustainable Agriculture
AS	3208 (2/25:10)	Human Ecology	AS	3221 (2/15:30)	Agro-ecotourism
AS	3209 (2/25:10)	Human Resource Management	AS	3222 (2/15:30)	Design and Analysis of Agricultural Systems
AS	3210 (2/25:10)	Macroeconomics	AS	3223 (2/25:10)	Quality Management in Agricultural Systems
AS	3211 (2/25:10)	Natural Resource Economics	AS	3224 (2/20:20)	Regenerative Agriculture and Innovations
AS	3212 (2/15:30)	Nonparametric and Categorical Data Analysis	AS	3225 (2/25:10)	Risk Management in Agricultural Systems
AS	3213 (2/25:10)	Rural Development and Development Communication			
<b>Department of Animal and Food Sciences</b>					
AF	3201 (2/25:10)	Animal Genetics and Breeding	AF	3211 (2/25:10)	Food and Nutrition
AF	3202 (2/20:20)	Dairy Processing Technology	AF	3212 (2/25:10)	Food Chemistry
AF	3203 (2/20:20)	Meat and Egg Product Technology	AF	3213 (2/20:20)	Postharvest Technology of Perishable Crops
AF	3204 (2/20:20)	Applied Animal Nutrition	AF	3214 (2/20:20)	Postharvest Technology of Grains, Oil Seeds, and Spices
AF	3205 (2/20:20)	Inland Fisheries and Ornamental Fish Culture	AF	3215 (2/25:10)	Food Preservation
AF	3206 (2/25:10)	Micro-livestock and Integrated Systems	AF	3216 (2/20:20)	Food Product Development and Sensory Evaluation

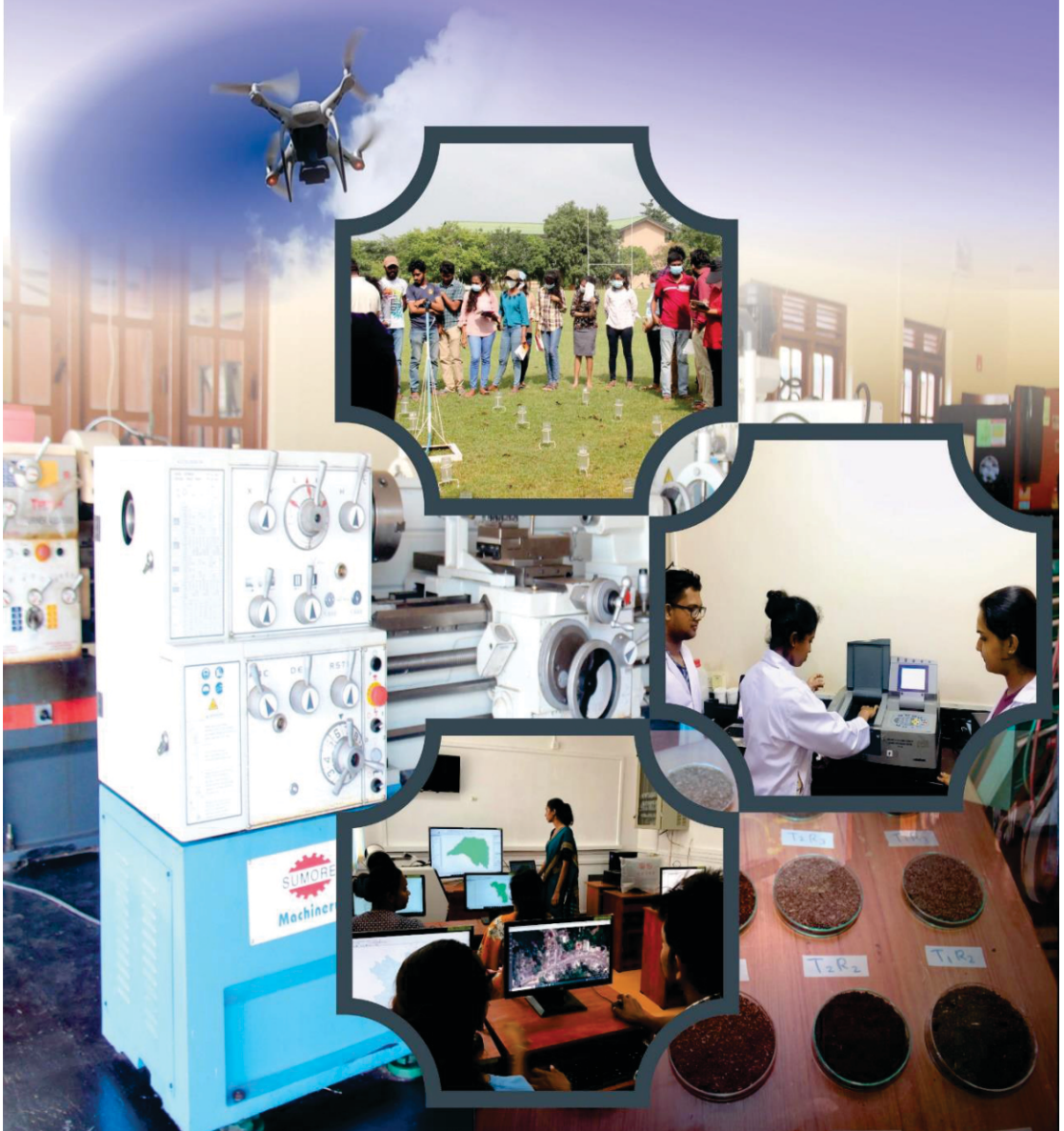
AF	3207 (2/25:10)	Wildlife Conservation and Management	AF	3217 (2/20:20)	Food Microbiology
AF	3208 (2/25:10)	Disease Management in Farm Animals	AF	3218 (2/25:10)	Food Packaging Technology
AF	3209 (2/25:10)	Fish Processing Technology	AF	3219 (2/15:30)	Food Analysis
AF	3210 (2/30:00)	Advances in Animal Production			
<b>Department of Plant Sciences</b>					
PS	3201 (2/25:10)	Crop Physiology	PS	3213 (2/20:20)	Biotechnology
PS	3202 (3/30:30)	Floriculture and Landscape Gardening	PS	3214 (2/15:30)	Plant Tissue Culture
PS	3203 (2/15:30)	Controlled Environment Agriculture	PS	3215 (2/20:20)	Applied and Economic Entomology
PS	3204 (3/40:10)	Advanced Field Crop Production	PS	3216 (2/15:30)	Clinical Plant Pathology
PS	3205 (2/25:10)	Organic Farming	PS	3217 (2/20:20)	Applied Microbiology
PS	3206 (2/25:10)	Forest Conservation and Restoration	PS	3218 (2/20:20)	Advanced Techniques in Molecular Biology
PS	3207 (2/25:10)	Agroecology	PS	3219 (2/20:20)	Bioinformatics
PS	3208 (2/25:10)	Weed Management	PS	3220 (2/20:20)	Germplasm Conservation
PS	3209 (2/15:30)	Cottage Farming Enterprise	PS	3221 (2/15:30)	Stored-product and Structural Pest Management
PS	3210 (2/15:30)	Plantation Forest Management	PS	3222 (2/25:10)	Advanced Phytopathology
PS	3211 (2/15:30)	Processing and Value Addition of Rubber, Spice & Beverage Crops	PS	3223 (2/25:10)	Insect Ecology and Behaviour
PS	3212 (2/25:10)	Plant Breeding Techniques	PS	3224 (1/00:30)	Academic and Business English **
<b>Common Course</b>					
CC	3201 (2/15:30)	Research Methods and Scientific Writing **			

Subjects superscripted with \*\* denote that they are credited and not contributing to the GPA

Year 4 Semester 1							
Course Code		Course Title		Course Code		Course Title	
<b>Department of Agricultural Engineering and Soil Science</b>							
ES	4101 (2/25:10)	Advanced Agricultural Engineering	ES	4102 (2/20:20)	Advanced Analytical Techniques for Environmental Studies		
<b>Department of Agricultural Systems</b>							
AS	4101 (2/25:10)	International Trade and Development	AS	4102 (2/20:20)	Contemporary Developments in Agricultural Systems		
AS	4104 (2/15:30)	English for Scientific Communication **					
<b>Department of Animal and Food Sciences</b>							
AF	4101 (2/25:10)	Farm Animal Welfare	AF	4102 (2/25:10)	Food Safety, Regulation, and Quality Management		
<b>Department of Plant Sciences</b>							
PS	4101 (2/15:30)	Processing and Value Addition of Tea & Coconut	PS	4102 (2/15:30)	Integrated Plant Protection Technology		
<b>Common Course</b>							
AS	4103 (2/15:30)	Statistical Software for Data Analysis	EG	4101 (2/15:30)	English for Employment		

*Subjects superscripted with \*\* denote that they are credited and not contributing to the GPA*

# DEPARTMENT OF AGRICULTURAL ENGINEERING AND SOIL SCIENCE



**DEPARTMENT OF AGRICULTURAL ENGINEERING AND SOIL SCIENCE**

**(1) Specialization - AGRICULTURAL ENGINEERING**

**Compulsory Courses**

**Optional Courses**

**Year 3 Semester 2**

ES 3201	Agricultural Engineering Systems Design and Construction	ES 3203	Computer Programming and Engineering Graphic Design
ES 3204	Food Process Engineering	ES 3220	Waste Management
ES 3221	Water Quality Assessment and Modelling	ES 3202	Climate Change and Environmental Sustainability
ES 3207	Irrigation Engineering	ES 3205	Innovation and Product Development
ES 3222	Watershed Management and Modelling	ES 3208	Mechatronics and Precision Agriculture
CC 3201	Research Methods and Scientific Writing	ES 3206	Integrated Management of Water Resources in Sri Lanka
		ES 3209	Remote Sensing and GIS
		ES 3219	Thermodynamics
		ES 3210	Renewable Energy Technology and Management
		AS 3209	Human Resource Management

**Year 4 Semester 1**

ES 4101	Advanced Agricultural Engineering
AS 4103	Statistical Software for Data Analysis
EG 4101	English for Employment

**(2) Specialization ENVIRONMENTAL SOIL MANAGEMENT****Compulsory Courses****Optional Courses****Year 3 Semester 2**

ES 3218	Sustainable Soil Management in Agriculture	ES 3220	Waste Management
ES 3213	Soil and Ecosystems	ES 3202	Climate Change and Environmental Sustainability
ES 3214	Soil Microbiology	ES 3206	Integrated Management of Water Resources in Sri Lanka
ES 3215	Soil Survey and Classification	ES 3211	Management of Degraded Lands
ES 3216	Soils of Sri Lanka	ES 3209	Remote Sensing and GIS
CC 3201	Research Methods and Scientific Writing	ES 3212	Rice Soil Management
		ES 3217	Sustainable Land Use Planning for Agriculture
		ES 3222	Watershed Management and Modelling
		PS 3205	Organic Farming
		AS 3209	Human Resource Management

**Year 4 Semester 1**

ES 4102	Advanced Analytical Techniques for Environmental Studies
AS 4103	Statistical Software for Data Analysis
EG 4101	English for Employment

## COURSE CAPSULES

### 6.1 DEPARTMENT OF AGRICULTURAL ENGINEERING & SOIL SCIENCE

#### **ES 3201 (2/25:10:65) Agricultural Engineering Systems Design and Construction**

Concepts of agricultural engineering systems designing; Strength of materials; Equilibrium of a rigid body; Analyses of trusses and beams; Evaluation of engineering structures; Fundamentals of planning farm buildings; Concrete structures; Wood preservation techniques; Road construction and fencing; Greenhouse construction.

#### **ES 3202 (2/25:10:65) Climate Change and Environmental Sustainability**

Climate and climate system; Greenhouse effect and global warming; Climate change and climate variability; Causes and evidence of climate change; Observed changes of climate system; Impact of climate change on water resources, crops, livestock, fisheries, and biodiversity; International organizations and treaties on climate change mitigation and adaptation; Vulnerability assessment; Climate change adaptation & mitigation strategies; Climate modelling; GCM and scenarios.

#### **ES 3203 (2/00:60:40) Computer Programming & Engineering Graphics Design**

Fundamentals of computer programming; Structure of a computer language application; Steps of developing applications; Introduction to CAD software (AutoCAD/Solid Work); 2D drawing with CAD; Development drawings; 3D modelling; Drawing printing.

#### **ES 3204 (2/25:10:65) Food Process Engineering**

Engineering properties of agricultural materials: physical, thermal, aero- & hydro-dynamic, electrical properties, rheology; Unit operations: mechanical transport, mechanical processing, mechanical separation; Heat transfer: methods, heat exchangers; Material and energy balances; Dehydration: drying theory, drying curves, novel drying methods; Packaging of food; Control of food processes: process parameters, control systems; Handling of processing equipment.

#### **ES 3205 (2/15:30:55) Innovation and Product Development**

Designing process: need assessment, problem identification, information gathering, concept generation, concept selection, communication of the design, detailed design and analysis, prototype development, manufacturing, life cycle assessment; Testing; Safety and product liability; Ergonomics; Intellectual property & patent; Workshop management; Engineering workshop tools and equipment; Workshop practices: cutting, drilling, shaping, metal work, fastening methods, lathe operations; Operation and maintenance of workshop machineries & equipment; Workshop safety; Combined project work.

#### **ES 3206 (2/25:10:65) Integrated Management of Water Resources in Sri Lanka**

Concept and principles of Integrated Water Resources Management (IWRM); Development of water resources; Tank cascade systems and their management; Multipurpose water resources development schemes; Groundwater resources, water quality and pollutant types; Impact of anthropogenic aspects on water pollution and management; Legal enactments of water resources management; Gender perspective in water management.

#### **ES 3207 (2/15:30:55) Irrigation Engineering**

Surface and subsurface irrigation methods: design, hydraulics, evaluation; Water flow on open channels; Water measurement and control structures; Pressurized irrigation systems: components, hydraulics, scheduling, evaluation, system maintenance, and troubleshooting; Chemigation; ICT applications in irrigation and water management; Groundwater exploration and well hydraulics.

**ES 3208 (2/25:10:65) Mechatronics and Precision Agriculture**

Fundamentals of mechatronics; Basic elements and components; Sensors, transducers and actuators; Applications of microprocessor based mechatronics projects; Fundamentals of precision agriculture; Applications of GPS and GIS in precision agriculture; Applications of different sensor technologies for collecting data; Grid point sampling; Yield monitoring systems; Variable Rate Technologies (VRTs) in precision agriculture; Site specific management strategies used in precision agriculture; Mapping of land and crop information using GIS and GPS techniques.

**ES 3209 (2/15:30:55) Remote Sensing and GIS**

Introduction to Geographic Information Technology (GIT); Fundamentals of Geographic Information System (GIS); Components of GIS; Applications and benefits of GIS; Data models; Basics of cartography; Coordinate systems; Fundamentals of Global Navigation Satellite System (GNSS); Applications of Global Position System (GPS); Fundamentals of Remote Sensing (RS) and its applications; Electromagnetic radiations; Energy interactions; Remote sensing platforms; Characteristics of satellites; Satellite systems; Concepts of spatial, spectral, radiometric and temporal resolutions; Interpreting optical RS images; Emerging trends in geographical technology.

**ES 3210 (2/25:10:65) Renewable Energy Technology and Management**

Basic principles and definitions; Different types of direct and indirect energy sources; Importance of renewable energy; Solar power: solar cells, solar dryers; Mini hydro power plants establishment; Wind power: uses, wind mills; Biogas: biogas plants, construction details; Biofuels: biodiesel and bioethanol, bioenergy from biomasses; Other renewable energy; Steam generation; Ocean thermal energy conversion; Calculation on energy conservation; Geo-thermal energy; Combustion of fuel and gasification; Energy losses; Environmental impacts of energy production and use.

**ES 3211 (2/20:20:60) Management of Degraded Lands**

Land degradation: causes, traditional and emerging types; Present status of land degradation in Sri Lanka; Impacts of land degradation on soil environment; Field assessment of degraded lands: physical, chemical and biological characteristics; Soil biodiversity changes in degraded lands; Socio-economic aspects related to land degradation; Effect of land degradation on rural livelihood; Land rehabilitation and restoration; Multidisciplinary approaches in degraded land management; Geospatial technologies for land degradation assessment and management.

**ES 3212 (2/25:10:65) Rice Soil Management**

Hydromorphic soils; Morphology of submerged soils; Physical and chemical characteristics of submerged soils; Microbiology under submergence; Nutrient transformation and availability under submerged conditions; Problems of submerged soils; Different rice growing soils in Sri Lanka; Aerobic rice farming; Sustainable management of rice soils; Amelioration of problem soils; Recent advances in rice soil management.

**ES 3213 (2/25:10:65) Soil and Ecosystems**

Types of ecosystems; The role of soil in ecosystems; Interactions of soil and ecosystem components; Dynamic nature of bio-geochemical cycles; Soil contaminants; Wetland ecosystems; Nutrient accumulation in aquatic ecosystems; Anthropogenic activities on ecosystem sustainability; Healthy management of ecosystem; Legal enactment of soil and ecosystem management.

**ES 3214 (2/20:20:60) Soil Microbiology**

Microbial environment of soil; Diversity distribution of soil microorganisms; Microbial biomass; Soil-microbial interaction; Mycorrhizae; Influence of microbes for root-rhizosphere signalling: rhizosphere effect, root exudates; Plant growth promoting substances; Biodegradation of organic & inorganic substances; Roles of soil microbes on nutrient cycles: microbiology of nitrogen cycle, microbial transformation of phosphorous, sulphur, iron, manganese, zinc and copper; Eco-friendly microbial fertilizers: biofertilizers, biopesticides, bio-filmed biofertilizers.



**ES 3215 (2/20:20:60) Soil Survey and Classification**

Historical development and basic concepts of soil survey and classification; Soil survey procedure; Applications of modern geospatial technologies in soil survey and classification; Satellite and proximally sensed data for soil mapping; Detailed soil profile description; Soil classification: USDA, FAO and regional; Soil orders in USDA soil taxonomy: Histosols, Alfisols, Inceptisols, Entisols, Ultisols, Oxisols, Vertisols, Andisols, Aridisols, Gelisols, Spodosols and Mollisols.

**ES 3216 (2/20:20:60) Soils of Sri Lanka**

Historical background and present status of soil studies in Sri Lanka; Physiography and geology of Sri Lanka; Classification of soils of Sri Lanka: World Reference Base (WRB), United State Department of Agriculture (USDA), great soil groups and soil series; Soil diversity of Sri Lanka: wet zone, intermediate zone and dry zone; Behaviour, potentials and limitations of Sri Lankan soils; Sustainable management of Sri Lankan soils.

**ES 3217 (2/20:20:60) Sustainable Land Use Planning for Agriculture**

Basic concepts of land use planning in national and international perspectives; Important land qualities and related characteristics in agriculture; Factors considered in farm site selection; Applications of geospatial technology in land use planning; Methods for agricultural land evaluation: land suitability classification and land capability classification; Sustainable Land Management: concepts, practices, and evaluation; Sustainable land use systems in Sri Lanka.

**ES 3218 (2/20:20:60) Sustainable Soil Management in Agriculture**

Significance of soil management; Characteristics of an ideally managed soil; Major soil constraints on sustainable crop production in Sri Lanka; Distribution and description of problem soils in Sri Lanka; Natural and anthropogenic causes leading to problems; Soil related problems: acidity, alkalinity, salinity, erosion; Impact of agrochemicals on soil environment and crop productivity; Fertilizers and soil degradation; Nutrient enrichment and impoverishment; Strategies for soil fertility improvement; Soil conservation.

**ES 3219 (2/25:10:65) Thermodynamics**

Zeroth law of thermodynamics; Thermodynamic properties of fluids; Temperature volume and phase diagrams; Computer-aided software for thermodynamic calculations; Thermodynamics & applications: first and second law; Thermodynamic cycles: power cycles, refrigeration cycles; Psychometrics & applications.

**ES 3220 (2/20:20:60) Waste Management**

Waste management concepts: waste generation streams, characterisation of waste; Parameters important in designing and monitoring waste treatment systems; Solid waste: treatment methods, systems; Wastewater treatment: wastewater characteristics, effluent treatment, constructed wetlands; Modern trends in waste management; Legal aspects of waste management.

**ES 3221 (2/15:30:55) Water Quality Assessment and Modelling**

Water quality: pollutants, parameters, monitoring, control measures; Water quality analysis: methods, instrumentation; Water quality assessment: standards, graphical interpretation, indices; Applications of GIS in water quality assessment; Water quality modelling; Recent advances in water quality assessment.

**ES 3222 (2/25:10:65) Watershed Management and Modelling**

Concept of watershed and watershed management; Watershed characteristics; Delineation of watershed boundaries; Integrated assessment of watershed health; Watershed models and their applications; Soil erosion assessment; Watershed rehabilitation; Soil and water conservation; Pollution prevention in watersheds; Environmental Impact Assessment (EIA); Socio-economic aspects in watershed planning and management.

**ES 4101 (2/25:10:65) Advanced Agricultural Engineering**

Traction: basic concepts, devices; Testing and evaluation of farm machinery; Machinery management: selection, cost evaluation; Fluid machinery; Planning and designing farm ponds/reservoirs; Reservoirs: classification, headwork, sedimentation; Recent advances in agricultural engineering.

**ES 4102 (2/20:20:60) Advanced Analytical Techniques for Environmental Studies**

Sampling techniques for environmental studies; Preparation of soil, plant, water and fertilizer samples; Extraction of nutrients from soil and plant samples; Principles and applications of turbidimetry and potentiometry; Analytical techniques of UV- visible spectroscopy, Atomic emission spectroscopy and atomic absorption spectroscopy; Elemental analyses of soil, plant, water and fertilizers; Interpretation of analytical data.



## DEPARTMENT OF AGRICULTURAL SYSTEMS

## (3) SPECIALIZATION AGRICULTURAL ECONOMICS AND EXTENSION

**Compulsory Courses****Optional Courses****Year 3 Semester 2**

AS 3201	Applied Econometrics	AS 3207	Agricultural Development and Policy
AS 3202	Extension Education	AS 3208	Human Ecology
AS 3203	Food Value Chain Analysis	AS 3209	Human Resource Management
AS 3204	Industrial English	AS 3210	Macroeconomics
AS 3205	Project Management	AS 3211	Natural Resource Economics
AS 3206	Social Research Methodology	AS 3212	Nonparametric and Categorical Data Analysis
CC 3201	Research Methods and Scientific Writing	AS 3213	Rural Development and Development Communication
		AS 3214	Rural Sociology
		AS 3215	Time Series Data Analysis

**Year 4 Semester 1**

AS 4101	International Trade and Development
AS 4103	Statistical Software for Data Analysis
AS 4104	English for Scientific Communication
EG 4101	English for Employment

**(4) SPECIALIZATION AGRICULTURAL SYSTEMS AND MANAGEMENT**

**Compulsory Courses**

**Optional Courses**

**Year 3 Semester 2**

AS 3216	Climate Smart Agricultural Systems
AS 3217	Food Security Assessment
AS 3218	Global Food Systems
AS 3219	Evolution of Technologies in Agricultural Systems
AS 3220	Sustainable Agriculture
AS 3204	Industrial English
CC 3201	Research Methods and Scientific Writing

AS 3221	Agro-ecotourism
AS 3222	Designing and Analysis of Agricultural Systems
AS 3223	Quality Management in Agricultural Systems
AS 3224	Regenerative Agriculture and Innovations
AS 3225	Risk Management in Agricultural Systems

**Year 4 Semester 1**

AS 4102	Contemporary Developments in Agricultural Systems
AS 4103	Statistical Software for Data Analysis
AS 4104	English for Scientific Communication
EG 4101	English for Employment

**COURSE CAPSULES****6.2 DEPARTMENT OF AGRICULTURAL SYSTEMS****AS 3201 (2/25:10:55) Applied Econometrics**

Introduction to econometric modelling; Hypothesis testing; correlation analysis; assumptions of linear regression analysis; Simple linear regression analysis; multiple linear regression analysis; qualitative response regression analysis; Problems of linear regression: multicollinearity, heteroscedasticity, autocorrelation; Econometric interpretations: regression coefficient, coefficient of determination, odds ratio.

**AS 3202 (2/25:10:65) Extension Education**

Domains of learning; Phases of learning; Extension learning and teaching process; Adult education; Andragogy vs. pedagogy; Monitoring and evaluation of extension programmes; Logic model; Agricultural knowledge management system; Urban extension; Information management in value chains; Gender issues in extension; ICT in agricultural extension; Theory of planned behaviour; Transtheoretical model.

**AS 3203 (2/25:10:65) Food Value Chain Analysis**

Concept of supply chains and value chains; Value and consumer; Value creation process; Dimensions and key elements of value chains; Different types of value chains; Perspectives, mapping and analysis; Value chains: upgrading, transformation and governance; Research methods in value chain analysis; Food value chains in Sri Lanka.

**AS 3204 (2/15:30:55) Industrial English**

Technical vocabulary; Workplace communication; Writing for work; Reading comprehension; Listening comprehension; Verbal communication skills; Interview skills; Meeting skills.

**AS 3205 (2/20:20:60) Project Management**

Overview and importance of project management; Role of the project manager; Project stakeholders and governance; Project life cycle; Project management process; Project scope, time, cost, quality, human resources, and communications management; Risk, procurement, and stakeholder management; Use of computer programmes for project management.

**AS 3206 (2/20:20:60) Social Research Methodology**

Introduction; Qualitative, quantitative, and mixed methods of social science research; Identifying research topics; Formulating research questions and objectives; Literature review; Formulating conceptual framework and hypothesis; Analytical methods for social science research; Use of statistical software; Results interpretation; Bibliography vs. reference list; Ethics in social research.

**AS 3207 (2/20:20:60) Agricultural Development and Policy**

Economic development: income and growth, evolution of development thought, development and underdevelopment, structural features; Role of agriculture in development; Theories of economic development; New growth theories; Inequality and development; Role of health, education, and trade on development; Agricultural policies: formulation, implementation and assessment of impacts; Agricultural policies in Sri Lanka; Social and economic wellbeing of farming communities.

**AS 3208 (2/25:10:65) Human Ecology**

Ecological perspective of human population; Human interventions in agricultural landscapes; Perceptions of nature; Interaction between social systems and agroecosystems, Cultural aspects in agroecosystem management; Human dimension of major agro-ecological issues; Natural resources and food systems in gender perspective; Agriculture and human wellbeing; Societal adaptations to

environmental stresses; Social transformations for sustainable food systems; Agricultural and environmental ethics; Pro-environmental behaviour; Contemporary issues and research perspectives in human ecology.

### **AS 3209 (2/25:10:65) Human Resource Management**

Human resource management; Human resource planning; Job analysis and job design; Recruitment and selection; Training and development; Employee management: motivation, compensation, appraisal, career planning, diversity, ethics, training; Performance management; Rewards management; Health and safety management; Industrial relations; Industrial labour law.

### **AS 3210 (2/25:10:65) Macroeconomics**

Overview of macroeconomics; Gross domestic production; Economic growth; Unemployment; Inflation; National income accounting; Growth theory; Neoclassical models; Aggregate demand and Aggregate supply model; Money; Exchange rate and interest rate; Goods market and fiscal policy; Money market and monetary policy; IS-LM model; Contemporary macroeconomic issues.

### **AS 3211 (2/25:10:65) Natural Resource Economics**

Environment and natural resources; Classification of natural resources; Necessary and sufficient conditions for economic efficiency, externalities, property rights; Public goods; Allocation and management of different types of resources; Recycling of resources; Valuation methods: travel cost method, hedonic pricing, contingency valuation; Software applications in natural resource valuation.

### **AS 3212 (2/15:30:55) Nonparametric and Categorical Data Analysis**

Introduction to parametric and nonparametric statistical procedures; Single samples inference based on Wilcoxon signed-rank and sign statistics; Inferences based on two sample using the Mann-Whitney test; Inference based on k-sample using Kruskal Wallis test and Friedman test; Multiple comparison procedures for nonparametric data; Independence between ordinal variables: Tests based on Kendall's tau and spearman's rho; Nonparametric regression; Simple linear regression and multiple linear regression using the Wilcoxon fit; Inference procedures for single population proportion; Two population proportion; Measures of association between categorical variables using chi-square test, Loglinear models for contingency tables; Loglinear-logit models for ordinal variables; Analysing binary variables using logistic regression; Analysing count data using Poisson regression.

### **AS 3213 (2/25:10:65) Rural Development and Development Communication**

Overview of rural sector; Rural poverty and demography; Economic growth theories, Planning and implementation of rural development projects; Past and present rural development projects in Sri Lanka; Analysis of rural development programmes in the Asian region; Role of communication in development; Participatory communication; Journalism and media use; Communication strategies in agriculture and national development; Planning and implementation of communication programmes for development.

### **AS 3214 (2/25:10:65) Rural Sociology**

Sociological perspective; Culture and its implications, socialization; Social interaction and social structure; Social inequality: class, stratification; Social institutions; Social movements and social change; Sociology of agri-food systems and natural resources; Analysis of agrarian social problems; Dry zone settlements; Sociological investigation; Social welfare and social security; Social work in agrarian communities.

**AS 3215 (2/15:30:55) Time Series Data Analysis**

Introduction to time series data analysis and forecasting; Smoothing techniques; Time series model building; Time series models: Moving Average (MA) models, Autoregressive models (AR), Autoregressive Integrated Moving Average (ARIMA) models; Seasonal ARIMA models; ARIMA modelling using expert systems; Transfer function models; Intervention analysis and outlier detection; Forecasting with time series models; Causality analysis; Data base handling in time series.

**AS 3216 (2/25:10:65) Climate Smart Agricultural Systems**

Climate change and global warming; Impact of climate change on agriculture and food security; Adaptation and mitigation; Climate-smart agriculture: basic principles, characteristics; Climate-smart crop and livestock production practices and technologies; Sustainable soil and land management for climate-smart agriculture; Water management options for climate resilience; Systems approach to address climate change issues in Sri Lanka.

**AS 3217 (2/20:20:60) Food Security Assessment**

Concepts of food security; Criteria used for defining food security; Household, national and global food security issues; Strategies for improving food security; Assessment tools and methods; Household food production systems: home-gardening, urban gardening, low/no space gardening, organic farming, permaculture, community gardening; Food processing and value addition; Contribution of food supply and value chains to food security.

**AS 3218 (2/25:10:65) Global Food Systems**

Concept of food system; Forces shaping the global food systems; Trends and behaviour of global food systems; Transformations of food systems: small- and large-scale food systems, role of small-scale farming systems in the global food production; Towards sustainable food systems; Global food policy perspectives.

**AS 3219 (2/25:10:5) Evolution of Technologies in Agricultural Systems**

Concept of traditional knowledge; Ten commandments of traditional society of Sri Lanka; Historical developments in Sri Lankan agriculture; Traditional agricultural technologies; Traditional food technologies; Traditional disaster management technologies; Green revolution and its impacts on agriculture and environment; Modern agricultural technologies; Sustainability of traditional and modern agricultural technologies; Predicting of future agricultural technologies.

**AS 3220 (2/20:20:60) Sustainable Agriculture**

Sustainable development; Agricultural sustainability; Sustainable development goals; Three pillars of sustainable development; Sustainable management of farm resources: lands, energy, water, other inputs; Biodiversity and sustainability; Green accounting for sustainable development; Sustainability assessment methods; Policies related to sustainable agricultural development.

**AS 3221 (2/15:30:55) Agro-ecotourism**

Overview of tourism and agro-ecotourism; Agro-ecotourism: different types, infrastructure; Managing a destination; Potential agro-ecotourism destinations in Sri Lanka; Landscape planning and designing for agro-ecotourism; Tourist satisfaction; Uses of digital technologies in promoting agro-ecotourism, Supportive policies and institutes for agro-ecotourism development in Sri Lanka.

**AS 3222 (2/15:30:55) Designing and Analysis of Agricultural Systems**

Agricultural systems modelling and simulation concepts and principles of linear programming; Linear programming and simulation for production planning; Crop growth modelling; APSIM model; Blockchain technology; Use of information systems in managing farming systems.



**AS 3223 (2/25:10:65) Quality Management in Agricultural Systems**

Quality management: definition, evolution, principles and components; Quality management issue in agricultural systems; Quality management systems; International and national quality organizations; Agriculture related quality policies; Standardization and technical regulations; Standards on agricultural systems and global trade; Conformity systems and assessment; Authentication and source verification of agricultural commodities; Strategies of quality improvement; Impact of quality management in agricultural systems for rural development.

**AS 3224 (2/20:20:60) Regenerative Agriculture and Innovations**

Concept and principles of regenerative agriculture; Regenerative agricultural practices: conservation agriculture, organic farming, biodynamic farming, regenerative grazing, agroforestry systems; Innovation in regenerative agriculture: forest farming, floating gardens; World agricultural heritage systems and regeneration of resources; Sustainability aspects of regenerative agriculture; Business potentials in regenerative farming.

**AS 3225 (2/25:10:65) Risk Management in Agricultural Systems**

Concept of risk and uncertainty; Different risk factors in agriculture: production risks, market risks; environmental risks; Strategies to manage production, market, financial, environmental, human resource-related risks; Quantitative techniques in agricultural risk management; Importance of building resilience in agriculture; Climate resilient farming systems; Decision support system for agricultural risk management.

**AS 4101 (2/25:10:65) International Trade and Development**

Trade and development linkage; Trade theories; The Ricardian model and the specific factors model, The Hecksher-Ohlin and the standard trade models; Gains from trade; Trade barriers; Analysis of tariff in a small open economy; Analysis of tariff in a large economy; Analysis of import and export quotas; Non-tariff barriers; Analysis of trade policies; Current trade issues; International trade agreements; Introduction to gravity model of trade.

**AS 4102 (2/20:20:60) Contemporary Developments in Agricultural Systems**

Problem tree analysis: identifying main problems, causes and effects, formulation of manageable objectives, propose strategies; Contemporary developments and related issues in agricultural systems: trade, climate change, capital, epidemics, technology advancements, lands and environment, e-agriculture, social aspects; Agricultural systems research for solving contemporary agricultural issues.

**AS 4103 (2/15:30:55) Statistical Software for Data Analysis**

Introduction to statistical software (SAS, MINITAB, R); Summarizing data sets (numerically and graphically); One sample and two sample t-test; Analysis of variance models for single factor and factorial experiments; Analysis of data from unbalanced designs; Regression analysis; Non-parametric data analysis; Categorical data analysis.

**AS 4104 (2/15:30:55) English for Scientific Communication**

Academic writing styles; Formal communication; Reading comprehension: synthesis, skimming, paraphrasing, summarizing academic reports; Listening comprehension; Reviewing literature; Referencing; Research writing: for academic audience and lay audience; Presentation skills; Science communication to lay audience.



# DEPARTMENT OF ANIMAL AND FOOD SCIENCES



**(5) SPECIALIZATION ANIMAL PRODUCTION AND TECHNOLOGY**

**Compulsory Courses**

**Optional Courses**

**Year 3 Semester 2**

AF 3201	Animal Genetics and Breeding	AF 3206	Integrated Micro Livestock Systems
AF 3202	Dairy Processing Technology	AF 3207	Wildlife Conservation and Management
AF 3203	Meat and Egg Product Technology	AF 3208	Disease Management in Farm Animals
AF 3204	Applied Animal Nutrition	AF 3209	Fish Processing Technology
AF 3205	Inland Fisheries and Ornamental Fish Culture	AF 3217	Food Microbiology
CC 3201	Research Methods and Scientific Writing	AF 3218	Food Packaging Technology
		AS 3209	Human Resource Management
		ES 3220	Waste Management
		PS 3205	Organic Farming

**Year 4 Semester 1**

AF 4101	Farm Animal Welfare
AS 4103	Statistical Software for Data Analysis
EG 4101	English for Employment

**(6) SPECIALIZATION FOOD AND POSTHARVEST TECHNOLOGY****Compulsory Courses****Optional Courses****Year 3 Semester 2**

AF 3211	Food and Nutrition	AF 3202	Dairy Processing Technology
AF 3212	Food Chemistry	AF 3203	Meat and Egg Product Technology
AF 3213	Postharvest Technology of Perishable Crops	AF 3209	Fish Processing Technology
AF 3214	Postharvest Techniques of Grains, Oil Seeds and Spices	AF 3216	Food Product Development and Sensory Evaluation
AF 3215	Food Preservation	AF 3217	Food Microbiology
CC 3201	Research Methods and Scientific Writing	AF 3218	Food Packaging Technology
		AS 3209	Human Resource Management
		ES 3220	Waste Management
		PS 3205	Organic Farming

**Year 4 Semester 1**

AF 4102	Food Safety, Regulation and Quality Management
AS 4103	Statistical Software for Data Analysis
EG 4101	English for Employment

## COURSE CAPSULES

### 6.3 DEPARTMENT OF ANIMAL AND FOOD SCIENCES

#### **AF 3201 (2/25:10:65) Animal Genetics and Breeding**

Domestication of farm animals; Animal genetic resources: conservation of animal genetic resources; Concepts of quantitative and qualitative genetics; Branches of genetics: Mendelian inheritance; Population genetics: Hardy-Weinberg equilibrium; Genetic relationships; Inbreeding; Estimation of genetic parameters; Genetic models; Heritability; Repeatability; Animal selection and breeding: principles of selection, response to selection, breeding values and selection methods; Breeding methods: outbreeding and crossbreeding; Animal breeding policies in Sri Lanka.

#### **AF 3202 (2/20:20:60) Dairy Processing Technology**

Physical and chemical properties of milk; Microbial spoilage of milk; Unit operations in milk processing; Dairy starter cultures; Fermented dairy products; Beneficial effects of fermented dairy products; Use of stabilizers in dairy products; Processing of yoghurt, curd, cheese, butter, whey, and ice cream; Production of dried milk products; Quality standards; Defects of dairy products; Current trends in dairy technology.

#### **AF 3203 (2/20:20:60) Meat and Egg Product Technology**

Antemortem and post-mortem inspection; Carcass evaluation; Abattoir design; Biology and composition of muscle; Conversion of muscle to meat; Quality attributes of meat; Meat and meat products; Secondary processing of meat; Advances in meat quality assessment and authentication; By-product utilization and value addition; Meat safety and zoonosis; Structure of an egg; Egg defect detection and quality assessment; Egg sorting and grading; Egg processing.

#### **AF 3204 (2/20:20:60) Applied Animal Nutrition**

Acts and regulations for animal feeds; Estimation of nutrient requirements: energy, protein, minerals and vitamins of farm animals; Balancing ration; Feeding standards; Methods of formulating feed mixtures; Evaluation of feedstuffs for livestock: proximate analysis, fibre analysis, feedstuff energy, protein, physical evaluation of feedstuff; Feeding trials: digestion and metabolism trials.

#### **AF 3205 (2/20:20:60) Inland Fisheries and Ornamental Fish Culture**

Capture and culture-based fisheries; Inland fisheries production and management: available species, fish breeding, fisheries organization, fish marketing network, laws and regulations, stock assessment and yield prediction, management and restoration, use of biotechnology; Ornamental fish industry; Common ornamental fish and aquatic plant species; Breeding and larval rearing of selected ornamental fishes; Feed and feeding management; Water quality management; Health management; Planning and designing an ornamental fish farm.

#### **AF 3206 (2/25:10:65) Micro-livestock and Integrated Systems**

Importance of micro-livestock industry; Constraints and potentials of non-traditional farm animals; Miscellaneous poultry production: village chicken, ducks, muscovy, geese, turkeys, guinea fowls, pigeons, quails; Other micro-livestock species farming: micro cattle, rabbit, guinea pig, deer, crocodile; Production systems: elements in a system, sustainable agriculture; Integrated farming systems: agro-silvo pastoral, livestock and livestock, duck cum fish cum rice, Kandyan forest garden with micro-livestock; Methods to promote uses of non-conventional animal products.

#### **AF 3207 (2/25:10:65) Wildlife Conservation and Management**

Principles in wildlife conservation and management; Major types of ecosystems; Ecological pyramids; Animal biodiversity; Important wild fauna in Sri Lanka; Physical and behavioural

adaptations in wild fauna; Invasive fauna; Regulatory aspects of wildlife conservation; Human-animal conflicts; Wildlife and agriculture trade-offs; Wild relatives of farm animals; Potentials and limitations of wildlife management.

#### **AF 3208 (2/25:10:65) Disease Management in Farm Animals**

Common diseases of farm animals; Bio-security measures for farm animal disease control and prevention; Diseases caused by bacteria, virus, protozoa, parasites; Metabolic disorders and nutritional deficiencies; Disease diagnosis; Basic epidemiological principles in diseases: investigation, immunity, transmission; Clinical signs, pathogenesis; Treatments of major diseases in livestock & fisheries.

#### **AF 3209 (2/25:10:65) Fish Processing Technology**

Economic importance of fisheries; Nutritional value of marine and inland fish; Physical and chemical composition of fish muscle; Fish spoilage: enzymatic, microbial; Handling of fish; Large scale fish processing; Pathogenic organism related with fish and fish products; Hygiene and sanitation during processing; Value addition of fish produce; Quality control of processed fish; Waste handling in fish processing.

#### **AF 3210 (2/30:00:70) Advances in Animal Production**

New trends in feeding livestock: precision feeding, dietary manipulation; Advances in animal biotechnology; Advances in dairy production and technology; Advances in meat processing; Advances in aquaculture; Precision livestock farming: principles, elements, sensors and automation in cattle, poultry, and pig.

#### **AF 3211 (2/25:10:65) Food and Nutrition**

Food, diet and nutrition; Nutrients and their impact on human health: carbohydrates, proteins, fats, vitamins, minerals, their recommended daily intakes, deficiency symptoms, disorders related to excess intakes and impact on human health; Assessing the nutritional status and nutritional requirements: methods in nutritional assessment, overnutrition and undernutrition, nutritional requirements of infants, adolescents, adults, pregnant and lactating women, elders; Lifestyle factors and their impact on human health: diet and dietary patterns, physical activity and other lifestyle factors, overweight/obesity, hypertension, type 2 diabetes, dyslipidemia; Planning a balanced diet: calculating energy requirements of individuals, basal metabolism, meal planning.

#### **AF 3212 (2/25:10:65) Food Chemistry**

Properties and role of water in foods; Properties, functions, and chemical reactions of foods; Carbohydrates: Maillard browning, caramelization, starch gel formation; Proteins: racemization, cross-link formation; Lipids: lipolysis, autoxidation; Enzymes in foods; Pigments; Flavours; Food additives; Changes in foods during storages.

#### **AF 3213 (2/20:20:60) Postharvest Technology of Perishable Crops**

Postharvest losses and causative factors; Pre-harvest factors affecting post-harvest quality; Functional values; Maturation and maturity indices; Harvesting; Physiology and biochemistry; Preparation for the fresh market: sorting, grading, waxing, curing, packaging, cooling, storage and transportation of fresh produce including fruit, vegetable, root and bulb crops; Fruit ripening and artificial ripening agents; Postharvest pest and disease management; Supply chain management of fresh produce; Processing of perishable crops.

#### **AF 3214 (2/20:20:60) Postharvest Technology of Grains, Oil Seeds and Spices**

Introduction; Postharvest losses and causative factors; Composition, nutritional value and utilization; Physical properties; Quality parameters; Sampling techniques and analysis; Primary processing: harvesting, threshing, cleaning, drying, parboiling, rice milling; Storage and warehouse management; Stored product pests; Secondary processing: flour, other value additions.

**AF 3215 (2/25:10:65) Food Preservation**

Food deterioration; Historical development of food preservation; Microbial kinetics of destruction; Thermal preservation: high-temperature preservation, low-temperature preservation; Non-thermal preservation: drying & dehydration, chemical, fermentation, irradiation; Effectiveness of combining preservation techniques; Novel food preservation techniques.

**AF 3216 (2/20:20:60) Food Product Development and Sensory Evaluation**

Overview of food product development; Unit operations; Food product development phases and consumer preference; New trends in food product development and practical exposure; Importance of sensory evaluation; Sensory attributes; Conducting sensory trial: sensory laboratory, panel selection, sample preparation, presentation and ballot sheets preparation, serving, sensory test methods, analysis and interpretation of sensory test data.

**AF 3217 (2/20:20:60) Food Microbiology**

History of food microbiology; Microorganisms in foods; Factors affecting microbial growth; Sources of microbial contaminations; Foodborne diseases, signs and symptoms; Estimation of the microbial population in foods: bacteria, yeast and moulds; Control of spoilage microorganisms; Use of microorganisms in the food industry: fermentation, food bio-preservatives, food ingredients, enzymes.

**AF 3218 (2/25:10:65) Food Packaging Technology**

Food packaging: functions, materials and barrier properties, forms; Shelf-life and quality of packaged products; Modern trends in food packaging; Design and development of packaging for different products: fruits, vegetables, fruit and vegetable-based products, cereals and cereal-based products, flesh foods and dairy products, and confectionery and beverages.

**AF 3219 (2/15:30:55) Food Analysis**

Introduction; Sampling procedures; Determination of pH and acidity, total solids; Determination of proximate composition: moisture, ash, protein, fat, fibre, and carbohydrate; Chromatography: paper, thin layer, partition, liquid and gas; Spectroscopy; Immunoassay; Colour analysis, microscopy and imaging techniques; Routine quality analysis.

**AF 4101 (2/25:10:65) Farm Animal Welfare**

Importance of farm animal welfare; Concepts of farm animal welfare; Five freedoms in farm animal management; Indicators of welfare: physiological, behavioural, production; Welfare issues associated with farm animal species; Farm animal welfare certification; Assessment of farm animal welfare; Ethical considerations in animal experiments.

**AF 4102 (2/25:10:65) Food Safety, Regulation, and Quality Management**

Overview of food safety and regulations; Food hazards: allergies, toxicology, adulterations, contaminants; Principles of food quality controlling; Food quality and safety management systems: HACCP, ISO; Quality standards and certifications for foods: SLS and Codex, Good manufacturing practices (GMP), Laboratory accreditation; Food regulation; Hygienic management of foods; Cleaning & sanitizing of food soils; Water quality in food safety; Designing food processing plant: equipment, site selection, building designing, Public health aspects in foods.

# DEPARTMENT OF PLANT SCIENCES





**DEPARTMENT OF PLANT SCIENCES**

**(7) SPECIALIZATION CROP SCIENCE**

**Compulsory Courses**

**Optional Courses**

**Year 3 Semester 2**

PS 3201	Crop Physiology
PS 3202	Floriculture and Landscape Horticulture
PS 3203	Controlled Environmental Agriculture
PS 3204	Advanced Field Crop Production
PS 3224	Academic and Business English
CC 3201	Research Methods and Scientific Writing

PS 3205	Organic Farming
PS 3206	Forest Conservation and Restoration
PS 3207	Agroecology
PS 3208	Weed Science
PS 3209	Cottage Farm Enterprises
PS 3210	Plantation Forest Management
PS 3211	Processing and Value Addition of Rubber, Spice & Beverage Crops
PS 3213	Biotechnology
PS 3214	Plant Tissue Culture
ES 3212	Remote Sensing and GIS in Agriculture

**Year 4 Semester 1**

PS 4101	Processing and Value Addition of Tea and Rubber
AS 4103	Statistical Software for Data Analysis
EG 4101	English for Employment

**(8) SPECIALIZATION AGRICULTURAL BIOLOGY****Compulsory Courses****Optional Courses****Year 3 Semester 2**

PS 3212	Plant Breeding Techniques	PS 3217	Applied Microbiology
PS 3213	Biotechnology	PS 3218	Advanced Techniques in Molecular Biology
PS 3214	Plant Tissue Culture	PS3219	Bioinformatics
PS 3215	Applied and Economic Entomology	PS3220	Germplasm Conservation
PS 3216	Clinical Plant Pathology	PS 3221	Stored-product and Structural Pest Management
PS 3224	Academic and Business English	PS 3222	Advanced Phytopathology
CC 3201	Research Methods and Scientific Writing	PS 3223	Insect Ecology and Behaviour
		PS 3208	Weed Science
		ES 3212	Remote Sensing and GIS in Agriculture

**Year 4 Semester 1**

PS 4107	Integrated Plant Protection Technology
AS 4103	Statistical Software for Data Analysis
EG 4101	English for Employment

## COURSE CAPSULES

### 6.4. DEPARTMENT OF PLANT SCIENCES

#### **PS 3201 (2/25:10:65) Crop Physiology**

Importance of crop physiology for yield improvement; Methods of crop yield improvement through manipulation of radiation interception and conversion; Determination of crop development by temperature and photoperiod; Partitioning of photosynthates and harvest index; Physiology of crop quality; Postharvest physiology; Physiological response of crops to environmental stress; Recent advances and future trends in crop physiology.

#### **PS 3202 (3/30:30:90) Floriculture and Landscape Gardening**

Overview on ornamental horticulture industry; Commercial cultivation of major ornamental species; Potted plant production; Floricultural value chain; Value addition for cut flowers and foliage: postharvest physiology, handling and senescence, flower drying techniques; History, principles and elements of landscaping; Home landscaping; Common landscaping plants: identification and ecological requirements; Landscape drawing; Hard landscaping; Cost estimation of landscape projects; Indoor gardening; Urban landscaping; Research and future trends.

#### **PS 3203 (2/15:30:55) Controlled Environment Agriculture**

Present status and future scope of controlled environment agriculture; Types and modifications of protected structures; Construction of protected structures; Microclimate control in greenhouses; Soilless crop production system: hydroponics, aeroponics and aggregate methods; Nursery techniques, fertigation systems, and pest and disease management in protected cropping; Protected cultivation of high-value crops; Recent trends in CEA.

#### **PS 3204 (3/40:10:100) Advanced Field Crop Production**

Advanced aspects of field management: rice, tropical cereals, pulses, root and tuber crops, tobacco, sugarcane and oil crops; Crop specific physiology: yield determination, source & sink relationship, vegetative & reproductive growth transition, nutrition, postharvest; Crop specific processing: rice, sugarcane, tobacco; Avenues of crop yield improvement: quantitative & qualitative; Integrated management of field crops; Plant breeding for changing environments.

#### **PS 3205 (2/25:10:65) Organic Farming**

Principles and concepts; Present status, existing potentials, and constraints; Legislative and regulatory procedures, certification, and transition to organic farming; Soil fertility and nutrient management; Crop protection in organic farming; Concepts of organic animal husbandry; Biodynamic farming; Research perspectives in organic farming.

#### **PS 3206 (2/25:10:65) Forest Conservation and Restoration**

Overview of forest conservation and restoration; Challenges for forest conservation: habitat destruction & fragmentation, landscape change, overharvesting, invasive species, climate change impacts on tropical forests; Forest conservation: conservation planning & priorities, roles of people in conservation; Forest restoration: ecological succession, overview of restoration ecology, Restoration Opportunities Assessment Methodology (ROAM), restoration tools & techniques, new technology in forest restoration, success stories of forest restoration in tropics.

#### **PS 3207 (2/25:10:65) Agroecology**

Case for fundamental change in agriculture; Three vignettes: setting the stage, lessons; Agroecology and the agroecosystem concept; Plants and abiotic factors of the environment; Autecological perspective: biotic factors, environmental complex; Population ecology of agroecosystems; Agroecosystem diversity; Competition and facilitation among crops: intercropping, crop rotation,

weeds, invasion, plough; Species interactions in crop communities: herbivory, disease ecology, biological control; Agriculture, society and environment; Toward sustainability: ecology of alternative cropping systems, sustainable agroecosystems and food system.

### **PS 3208 (2/25:10:65) Weed Science**

Overview on weed science; Characters of noxious weeds; Weeds of global and national significance; Weed: biology, competition; Weed management: manual, mechanical, cultural, biological, chemical, integrated weed management; Herbicides: history, herbicide formulations, classification, mode of action, herbicide toxicity; Fate of herbicides in plant and soil: herbicide absorption by plants, effects of environmental factors on herbicide activity, resistance development; Herbicide usage: precautions, first aids and antidotes; Global and Sri Lankan scenario of herbicide industry, herbicide registration.

### **PS 3209 (2/15:30:55) Cottage Farming Enterprise**

Mushroom culture; Biology and production of straw, oyster and button mushroom; Substance preparation and production of spawn; Pest and Disease management in mushroom culture; Harvesting, post-harvesting and marketing aspects of mushroom; Beekeeping: honeybee species, biology and behaviour of honeybees, beekeeping tools; management practices; Swarming and absconding, capturing, establishment, dividing of colonies; Nutritive benefit of bee honey; Commercial products derived from beekeeping; Recent advances in beekeeping; Commercial plant nursery management: establishment of the nursery as an enterprise, plant propagation method and general management practices in a commercial plant nursery.

### **PS 3210 (2/15:30:55) Plantation Forest Management**

Overview on plantation forestry; Species selection; Seed collection; Management of forest nursery; Planning and implementation of plantation forests; Silvicultural treatments and stand manipulation; Regeneration techniques; Protection of forest plantations; Forest mensuration; Harvesting and processing of timber; Saw milling technology; Wood seasoning and preservation; Timber utilization; Agro-forestry and social forestry for rural development; Forest plantation for climate change mitigation.

### **PS 3211 (2/15:30:55) Processing and Value Addition of Rubber, Spice and Beverage Crops**

Present status, potentials, and constraints of rubber, spice and beverage crops; Harvesting and processing of rubber: RSS, TSR, crepe rubber, centrifuge latex; Effluent management in rubber processing; Production and processing of spice and beverage crops; Value addition and marketing; Climate change impacts and adaptation techniques; Research perspectives of rubber, spice and beverage crops.

### **PS 3212 (2/25:10:65) Plant Breeding Techniques**

Overview to genetics and breeding; Genetic basis of crop improvement; Modes of reproduction: self- and cross-pollinated crops, pollination control; Classical breeding techniques; Advanced breeding techniques: mutation breeding, transgene in plant breeding, molecular plant breeding; Molecular plant breeding: gene editing, breeding for enhanced value and composition, breeding for abiotic and biotic resistance; Breeding for enhanced value and composition; Designing plant breeding trials.

### **PS 3213 (2/20:20:60) Biotechnology**

Eukaryotic chromosome architecture; Central dogma; Genome structure: transposable genetic elements, synteny and repetitive regions; PCR and gel electrophoresis; Overview on molecular markers; Gene expression: structure of genes and transcripts, operons and RNA processing; Gene regulation and RNAi technology; Sequencing techniques: Sanger sequencing, introduction to next generation sequencing & RNaseq technologies; rDNA technology: restriction enzymes, cloning

vectors, gene transformation and screening of recombinants; Protein extraction and quantification; Application of biotechnology in agriculture and industry: transgenic crop production, edible vaccines, antibiotics, fermentation and bioreactors.

### **PS 3214 (2/15:30:55) Plant Tissue Culture**

Overview on plant tissue culture; Organization of a plant tissue culture laboratory; Aseptic environment and explants' surface sterilization; Plant tissue culture media; Micro-propagation; Tissue culture systems: callus culture, suspension culture, somatic embryogenesis, protoplast culture, haploid production; Somaclonal variation; Production of disease free plants: thermotherapy, chemotherapy, meristem & callus cultures, micro grafting and virus indexing; Secondary metabolite production in *in vitro*; *In vitro* germplasm conservation; *In vitro* flowering and tuberization; Application of plant tissue culture in research and commercial purposes.

### **PS 3215 (2/20:20:60) Applied and Economic Entomology**

Insect phylogeny and taxonomy; Insect identification: use of keys and reference collections, preparation of specimens; Economical importance of insects: pests, beneficial insects, commercial products derived from insects; Molecular techniques in entomology; Bioinformatics in entomology; Nitrogenous excretion in insects; Effect of environmental factors on physiology of insects; Insect diapause and aestivation; Pheromone biology; Chemoreceptors, mechanoreceptors, visual receptors; Effector organs, sensory input and effector output; Post-embryonic development; Plant parasitic nematodes; Acarines.

### **PS 3216 (2/15:30:55) Clinical Plant Pathology**

Overview of clinical plant pathology; Sterilization of plant pathological tools and equipment; *In vitro* cultures of plant pathogens: isolation, inoculation, identification, confirmation, and maintenance; Quantification of fungal and bacterial inocula; Conventional and molecular biological techniques in diagnosing plant pathogenic microorganisms and nematodes; Management of plant pathogens: chemical and biological; Systematic approach for plant disease diagnosis.

### **PS 3217 (2/20:20:60) Applied Microbiology**

Macro molecular interactions; Membrane transport; Actions of antibiotics; Regulation of prokaryotic gene expression; Microbial stress response; Quorum sensing; Biofilms, biosensors and biochips; Plant-microbe interactions: endophytes, biological nitrogen fixation and mycorrhizal symbiosis; Biofertilizers and biopesticides; Bioremediation and bio-deterioration; Plant defence mechanisms; Immunity to bacteria and virus; Novel techniques for detection and identification of antibodies and immunoglobulins; Industrial applications: microbial synthesis of pharmaceuticals and organic compounds.

### **PS 3218 (2/20:20:60) Advanced Techniques in Molecular Biology**

Overview on advanced molecular biological techniques; Genomics: next generation sequencing techniques and different PCR types; Transcriptomics and gene expression: RNA sequencing and gene expression analysis by RT-qPCR; Gene regulation: mutagenesis, functional complementation of genes, clustered regularly interspaced short palindromic repeats and CRISPR-cas9 gene editing system, gene silencing by RNAi; Proteomics: protein over expression, detection of protein-protein interactions, and fluorescence protein studies.

### **PS 3219 (2/20:20:60) Bioinformatics**

Overview on bioinformatics; Biological databases; Web resources for bioinformatics; Exploring the genome with genome browsers; DNA and protein databases: tools for pair-wise sequence alignments, multiple sequence alignments; Molecular phylogenetics: phylogenetic tree construction programs; Prediction of protein structure and functions; Genome annotation and comparative genomics.

**PS 3220 (2/20:20:65) Germplasm Conservation**

Plant genetic resources (PGR); Exploration techniques; Importance of germplasm conservation; Germplasm collection principles and methods; Concept of valuation and rationale for valuing PGR; Characterization and evaluation of PGR; Morphometric, biochemical, and molecular characterizations; Phylogenetic analysis; Fundamentals of PGR conservation; *In-situ* and *ex-situ* conservations; Institutions involved in PGR conservation.

**PS 3221 (2/15:30:55) Stored-Product and Structural Pest Management**

Overview on stored-product pest management; Groups of organisms in food stores, identification, their salient features, biology and ecology; Insect infestation of stored/processed products and in storage facilities; Quantitative and qualitative losses; Pest in stored food and processing facilities: detection, sampling of insects, conventional and novel methods used for management; Strategies for the management of a given pest infestation.

**PS 3222 (2/25:10:65) Advanced Phytopathology**

Overview of phytopathology; Bacteria, fungi, and virus: morphology, genetics, replication, infection, transmission, signs & symptoms; Significance of phytoplasma and parasitic plants; Plant-pathogen interactions; Effects of pathogens on plant physiology; Genetic basis of resistance and virulence, induced and systemic acquired resistance; Secretory pathways; Epidemiology; Disease forecasting & modelling; Novel plant disease diagnostic tools & techniques; Integrated disease management; Biotechnological approaches in phytopathology; Current trends in phytopathology.

**PS 3223 (2/25:10:65) Insect Ecology and Behaviour**

Relationships among insects, plants and physical environment; Insect behaviour: orientation, dispersal, feeding, locomotion, defence, sound production, mating; Visual and chemical communication; Insect semiochemicals, intraspecific and interspecific communication; Air movement, dispersal and migration of insects; Insect population dynamics; Ecological effects of light; Intra- and inter-specific competition; Predation and parasitism; Insect-plant coevolution; Seasonal effects on conspecific insect behaviour.

**PS 3224 (1/00:30:20) Academic and Business English**

Root causes for inappropriate use of English; English as a foreign language and linguistic map space; Personalized English learning; Toolkit for learning English: English cinema, social media, online courses, apps; Avoid cross-translation; Think and express in English; Self-directed learning blended with listening, reading, writing, and speaking; Movie/documentary night; Reading and writing camp; Public debate.

**PS 4101 (2/15:30:55) Processing and Value Addition of Tea & Coconut**

Present status, potentials and constraints of tea and coconut sectors; Harvesting and processing of tea: orthodox, CTC and green tea; Harvesting and processing of coconut: kernel, husk and sap-based products; Value addition, quality management and certification; Marketing; Labour management; Climate change impacts and adaptation techniques; Research perspectives in tea and coconut.

**PS 4102 (2/15:30:55) Integrated Plant Protection Technology**

Emergence of pest problems; Evolution of pest management; Pest surveillance; Decision making in pest management; Ecological aspects of pest management; Host plant resistance; Pest management techniques: biological, microbial, sterile insect technique; cultural, physical, mechanical regulator, chemical; Pesticides: classification formulations, chemistry, modes of action; Pesticide regulation; Case studies on integrated pest management (IPM).

**CC 3201 (2/15:30:55) Research Methods and Scientific Writing**

Research philosophy and scientific method; Reading for research: identification and mapping of keywords and concepts from selected scientific articles; Problem identification and justification; Setting objectives and hypotheses; Types of research methods (field and laboratory experiments, cross sectional, quasi-experiments and observational designs); Data analysis, interpretation and presentation; Discussion of research findings; Ethics in research and publication; Scientific communication to different audiences; Making effective scientific presentations; Presentation of research proposals.

**EG 4101 (2/15:30:55) English for Employment**

Effective communication in the workplace; Grammar for business communication; Listening comprehension; Reading comprehension; Writing skills for the workplace; Spoken skills for the workplace.

**AF/AS/ES/PS 4202 (2/00:160:40) Industrial Training/ Internship**

Induction to industrial environment; Massive open online courses (MOOC) on employability; Career mentoring; Employability; Self-reflection using SEAL process (Situation, Effect, Action, Learning): Gap & SWOT analysis.

**AF/AS/ES/PS 4201(6:00:00:600) Research Project**

Acquire, develop and demonstrate the requisite knowledge, skills and attitudes/mindset; Work independently and collaboratively; Problem based learning and hypothesis formulation; Design and analysis of experiments; Knowledge innovation; Dissemination of knowledge.

## 7.0 PROGRESSION OF THE ACADEMIC PROGRAMME

### 7.1. SELECTION OF A SPECIALIZATION MODULE

At the successful completion of the fifth semester (i.e., 3<sup>rd</sup> year 1<sup>st</sup> semester), the core programme will be concluded. The continuation will allow the student to select an advanced module from one department of study.

A student can select a desired module for their advanced programme out of eight (08) modules offered by four (04) departments of study after successful completion of studies up to the 3<sup>rd</sup> year 1<sup>st</sup> semester. Students are allowed to have a preferential selection; however, in a situation of a number that exceeds the ceiling, the module/ department shall decide a strategy of streamlining.

A student, who has completed all exams till 2<sup>nd</sup> year 1<sup>st</sup> semester with a minimum SGPA of 2.00 is eligible for considering to an advanced module. Furthermore, any incomplete or repeat course/s of 2<sup>nd</sup> year 2<sup>nd</sup> semester must be completed with immediate attempt with a grade not less than grade of "C-". Students who have incomplete or repeat course/s in 2<sup>nd</sup> year 2<sup>nd</sup> semester can select an advanced module; however, these students shall consider under scholastic probation. With either unsuccessful attempt or failure to sit to the exam shall be treated with an academic dismissal, hence the scholastic probation students shall not allow to proceed their academic work in a Specialization module until successful completion.

Students who have not obtained a SGPA of 2.00 in minimum shall not be considered as qualified for continuing the academic work in an advanced module. Such a student shall grant an academic dismissal until the desired qualification is met.

### 7.2. UNDERGRADUATE RESEARCH AND REPORT

The research project during the 4<sup>th</sup> year 2<sup>nd</sup> semester 2 shall be assessed continuously and marks will be allocated as follows.

Marks for different evaluation components of research project

Assessment Strategy	Proportionate marks (%)	Assessment Method
Project Proposal <ul style="list-style-type: none"> <li>Proposal presentation</li> <li>Proposal report</li> </ul>	10 10	<ul style="list-style-type: none"> <li>Proposals will be evaluated by a panel appointed by respective departments.</li> <li>Individually evaluated by the internal and external supervisors</li> </ul>
Student Profile	25	<ul style="list-style-type: none"> <li>Individually and continuous evaluated by the internal and external supervisors</li> </ul>
Final Presentation	25	<ul style="list-style-type: none"> <li>An appointed panel will evaluate students by respective departments.</li> </ul>
Thesis	30	<ul style="list-style-type: none"> <li>Individually and continuous evaluation by the internal and/or external supervisors</li> </ul>



One (01) hard-bound copy of the undergraduate research report, certified by the supervisors and the Head of the Department shall be submitted to the Examinations Branch on or before the last date specified for the report submission; else, the student shall award a maximum grade of “C”. An electronic version of the project report should be deposited in the university/ faculty library repository to be eligible for graduation.

**7.3. THE INDUSTRIAL TRAINING INTERNSHIP EVALUATION**

<b>Assessment strategy</b>		<b>Proportionate marks (%)</b>
Continuous assessment	• Progress report – 02	10
	• Student logbook	10
	• Portfolio	20
	• Training report	20
	• Individual presentation at the end of training period	40
Total		100

Student should submit the training report, certified by the external and internal training advisors and Head of the respective department before the last date specified for the submission. Such students shall award the effective date as described in section 4.0, otherwise, the date of submission of the training report shall be considered as the effective date of the degree. Submission of the training report is a pre-requisite for graduation.

## 8.0 SCHEME OF GRADING

### 8.1. GRADE POINT VALUE

A letter grade is given for each course after completing assessments including continuous and end semester examinations. The grade shall be given to the final-rounded mark of each course. The final mark is graded for a Grade Point Value (GPV) between 0.00–4.00. Cut off marks and corresponding grade points for each grade are given Table 3.1.

**Table 8.1. Marks with respective grade and grade point**

Letter Grade	Percentage Mark	Grade Point Value
A+	≥ 85	4.0
A	80–84	4.0
A-	75–79	3.7
B+	70–74	3.3
B	65–69	3.0
B-	60–64	2.7
C+	55–59	2.3
C	50–54	2.0
C-	45–49	1.7
D	40–44	1.3
F	<40	0.0

A letter grade shall be offered for non-grade point contributing (non-GPA) subjects following the same criteria as specified for other subjects, while the criterion for completion is the same as a GPA contributing course.

### 8.2. GRADE AND GRADE POINT AVERAGE

Grades and Grade points shall be assigned for each course according to the overall marks obtained for all components for the course. Marks with respective grades and grade points are shown in Table 9.1.

#### 8.2.1. Calculation of Semester Grade Point Average (SGPA)

Semester Grade Point Average (SGPA) is calculated using the following formula and students will have a grade based on their performance for the semester.

$$SGPA = \frac{\sum C_i G_i}{\sum C_i}$$

where.

$C_i$  = Number of credits of the  $i^{\text{th}}$  course

$G_i$  = Grade point obtained for the  $i^{\text{th}}$  course

### 8.2.2. Final [overall] Grade Point Average

The Final Grade Point Average (FGPA) is calculated using the following formula and students will have a final grade based on their performances during the degree programme.

$$FGPA = \frac{\sum C_{ij}G_i}{\sum C_i}$$

where.

$C_{ij}$  = Number of credits of the  $i^{\text{th}}$  course in the  $j^{\text{th}}$  semester

$G_i$  = Grade point obtained for the  $i^{\text{th}}$  course

### 8.3. AWARDING OF CLASSES

The level of performance shall be offered based on the FGPA as indicated Table 3.2.

**Table 8.3. FGPA and Respective Grades**

Level of performance	FGPA
First Class	$\geq 3.70$
Second Class (Upper Division)	3.30 – 3.69
Second Class (Lower Division)	3.00 – 3.29
Pass	2.00 – 2.99

To be eligible for a class, a student shall successfully complete the degree programme within four (04) academic years, except for situations accepted by the Faculty Board and approved by the University Senate. A first class shall not be offered to a student with referred courses of a maximum of 06 credits.

### 8.4. COMPLETION OF THE DEGREE

To award the degree, the student shall complete all the required courses including industrial training and research project and also needs to complete a minimum of 128 credits.

A student should maintain the Final Grade Point Average (FGPA) at the level of 2.00 or above. The student should repeat the courses with “F” grade at the next earliest opportunity and the student can only obtain a maximum of “C” grade.

Students with a FGPA of less than 2.00 shall come under Scholastic Probation until the FGPA is elevated to 2.00 by repeating failed courses and/or taking some more optional courses. For such a student, the respective mentor shall be consulted, and the mentor shall recommend the progression of the student.

The maximum period allowed for completing the degree programme by a student is set at seven (07) academic years from the date of commencement of the degree programme (registration to the degree) excluding any period of delay or backlog caused by the common causes (i.e., trade union actions, natural disasters, political and civil riots, etc.).

In a case, a student becomes incomplete in the degree programme by the maximum period of speculated, the student shall be considered for an award of qualification below the SLQF level 6 as appropriate upon a written request of such student made within one (01) year reckoned from the end of seventh (07th) academic year. To be eligible for such consideration, a minimum of 90 credits should have been completed with a minimum SGPA of 2.00.

#### **8.5. EFFECTIVE DATE OF THE DEGREE**

The effective date of the BSc Hons. (Agriculture) degree shall be the last date of the written or oral examination.

In order to be eligible for this effective date, a candidate shall submit the completed copy of the internship report within two (02) weeks after completion of the examination.

**9.0. MEDALS, DEAN'S LIST AND FACULTY AWARDS**

**9.1. GOLD MEDAL CRITERIA**

Students are awarded with gold medals in respective convocation for their excellence in academic and scholarly work according to the criteria given below.

No:	Medal Awarded	Name of the medal	Awarding Criteria
1	Gold Medal for Overall Highest FGPA	Prof. Aruni Weerasinghe Gold Medal	<ul style="list-style-type: none"> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
2	Gold Medal for Highest GPA in Core Programme	Mr. Vincent Subasinghe Gold Medal	<ul style="list-style-type: none"> <li>• The student should possess the highest GPA in Core courses (from first to fifth semester).</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
3	Most Outstanding Performance in the Department of Agricultural Engineering & Soil Science	Dr. D.M. Jinadasa Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Environmental Soil Management or Agricultural Engineering.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
4	Most Outstanding Performance in Agricultural Engineering Specialization Module	Prof. K.D.N. Weerasinghe Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Agricultural Engineering.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>

5	Most Outstanding Performance in Environmental Soil Management Specialization Module	Prof. K.A. Nandasena Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Environmental Soil Management.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
6	Most Outstanding Performance in the Department of Agricultural Systems	Prof. S.L. Ranamukhaarachchi Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Agricultural Economics &amp; Extension or Agricultural Systems &amp; Management.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
7	Most Outstanding Performance in Agricultural Systems & Management Specialization Module	Prof. G.A.S. Ginigaddara Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Agricultural Systems and Management module.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
8	Most Outstanding Performance in Agricultural Economics & Extension Specialization Module	Dr. L.P. Rupasena Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Agricultural Economics and Extension module.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>

9	Most Outstanding Performance in the Department of Animal & Food Sciences	Prof. Vijay Jayasena Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Animal Production &amp; Technology or Food &amp; Postharvest Technology.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
10	Most Outstanding Performance in Animal Production & Technology Specialization Module	Prof. A.M.J.B. Adikari Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Animal Production &amp; Technology.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
11	Most Outstanding Performance in Food & Postharvest Technology Specialization Module	Dr. P.H.P. Prasanna Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Food &amp; Postharvest Technology.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
12	Most Outstanding Performance in the Department of Plant Sciences	Dr. Sena Yaddheghe Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Crop Science or Agricultural Biology.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>

13	Most Outstanding Performance in Agricultural Biology specialization module	Prof. Abhaya Balasuriya Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Agricultural Biology.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>
12.	Most Outstanding Student in Advanced Module Crop Science	Prof. U.R. Sangakkara Memorial Gold Medal	<ul style="list-style-type: none"> <li>• The student should specialize in Crop Science.</li> <li>• The student should possess the highest FGPA and at least with 2<sup>nd</sup> class upper division.</li> <li>• The student should pass all the subjects at the 01<sup>st</sup> attempt.</li> <li>• The student should have maintained a good discipline within his/her academic period.</li> </ul>

## 9.2. DEAN'S LIST

The students are eligible to be considered on the Dean's list depending on their overall performances during the period of study. The students who have been considered on the Dean's list will be given a recognition by a certificate and denoting such performance in the transcript. The Dean's list committee shall make the grading for a self-made assessment by a student and a student shall be eligible to apply for their eligibility at the end of each academic year. Students will be evaluated in the following criteria.

- Academic achievements (SGPA of a particular year)
- Prizes/awards received during the respective year
- Sports based achievements the respective year
- Extracurricular activities of the respective year
- Research and Pursuing Knowledge of the respective year
- Creativity and Exceptional Abilities in Aesthetic or Technical Fields of the respective year
- Community Service and Good Citizenship of the respective year

Students shall submit an application obtained through the MIS, with all proofs for eligible criteria along with the recommendation of the respective mentor at the end of each academic year.



### 9.3. FACULTY AWARDS

Faculty awards will be awarded for students with exceptional academic excellence. The selection will be based on the SGPA of a particular year of application. Students shall submit an application obtained through the MIS, with all proofs for eligible criteria along with the recommendation of the respective mentor at the end of each academic year.

Four such awards will be awarded per year.

### 10.0. UNIVERSITY STUDENT DISCIPLINARY – BY-LAWS



#### EXAMINATION PROCEDURES, OFFENCES AND PUNISHMENTS

##### Rules and Regulations Governing the Holding of Examinations

- Student should be at the examination hall 15 minutes before the commencement of the relevant examination. He/she should enter the examination hall only when informed to do so by the supervisor.
- After entering the examination hall, the student should be seated at the desk/table bearing their index number.
- Student is permitted to bring useful items such as pens, pencils, erasers, ink, rulers, geometrical instruments, coloured pencils etc. to the examination hall. No student is allowed to bring in any written paper or notes or any kind of electronic device or accessories or any other item, which may be misused at the examination.
- Every student must bring the admission card issued by the Assistant Registrar, student record book and the student identity card to the examination hall. In case of student unable to provide the student record book and the student identity card, the candidate must submit either the national identity card or a recent photograph certified by an authorized officer.
- When requested by the supervisor of the examination, student must surrender all documents in their possession.
- No student should ask another candidate for anything, exchange anything, engage in conversation, copy from another or help or encourage another candidate to copy.
- Student should write his/her answers only in the answer sheets or answer books issued on the particular date of the examination.
- Writing paper such as answer sheets, graph paper, drawing paper, ledger and journal sheets required by the student will be issued to them at the examination centre. Student is advised not to tear, bend crumple, or destroy any paper or answer sheet given to him/her. Writing paper that has been issued only by the supervisor should be used at the examination. Log tables should be used carefully and left on the table after use. All stationery supplied to the student, both used and unused, should be left on the desk when student leaves the examination hall.

- Before answering the question paper, student should write his/her index number and the name of the examination in the relevant place in the answer script. The index number should also be written in all other sheets used for answering questions. No student should write his/her name or place any identification mark on the answer script. It should also be noted that using the index number of another is a breach of examination rules.
- All paper used for rough work should be crossed with a line and annexed to the answer script. Rough work should not be done on the admission card, timetable, or question paper.
- Student must maintain strict silence both inside and outside the examination hall and not disturb the supervisor, invigilators, and other students.
- Impersonation of any kind is strictly prohibited.
- The supervisor or the invigilators have the authority to call for a written statement from a student regarding any unauthorized incident that takes place in the examination hall involving the respective student. The respective student should not refuse to make such a statement or sign a statement written by the supervisor regarding the said unauthorized incident.
- Answer scripts should be personally handed over to the Supervisor or an Invigilator. Answer scripts should not be handed over to anyone else for whatever the reason. All students should remain seated until all answer scripts are collected and counted.
- Student must make sure that he/she does not have in his/her possession any document, note or device which can be misused at the examination. He/she must also ensure that he/she does not indulge in an act, which can give rise to he/she is being suspected of misconduct at the examination.

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