



# Faculty of Agriculture

## Undergraduate

## Prospectus

2018 - 2021



*Eastern University, Sri Lanka*



# Bachelor of Science Honours in Agriculture Degree Programme

## Prospectus

2016/2017, 2017/2018, 2018/2019, 2019/2020, 2020/2021



**FACULTY OF AGRICULTURE  
EASTERN UNIVERSITY  
SRI LANKA**

Copyright: @2018 Faculty of Agriculture,  
Eastern University, Sri Lanka,  
Palachcholai,  
Kaluwankerny, (E.P) 30372.  
Sri Lanka.

The contents of this prospectus were prepared by  
Curriculum Development Committee,  
Faculty of Agriculture,  
Eastern University, Sri Lanka.

☎ +94653121750

✉ dean\_fag@esn.ac.lk

## CONTENTS

<b>Eastern University, Sri Lanka</b>	<b>Page</b>
Introduction	1
Officers of the Eastern University, Sri Lanka	1
<b>Faculty of Agriculture</b>	<b>2</b>
History	2
Vision	3
Mission	3
Officers of the Faculty of Agriculture	4
Organizational Chart of the Faculty	5
Faculty Board Members	6
<b>Members of the Academic Staff</b>	<b>8</b>
Department of Agricultural Biology	8
Department of Agricultural Chemistry	8
Department of Agricultural Economics	9
Department of Agricultural Engineering	9
Department of Animal Science	10
Department of Crop Science	10
<b>B.Sc. Honours in Agriculture Degree Programme</b>	<b>11</b>
Structure of the Academic Programme	11
Objectives of the Degree Programme	11
Graduate Profile	11
Semester System	12
Course Code	12
Abbreviations used in the Departments of Study	12
Credit Unit	12
Structure of the Degree Programme	13
Common courses	13
Inter-Faculty Course	14
<b>Courses in the Core Programme –</b>	<b>15</b>
B.Sc. Honours in Agriculture Degree	15
<b>Summary of Credit Units</b>	<b>17</b>
Core Programme	17
Departmental Specialization ~ (From 3 <sup>rd</sup> year 2 <sup>nd</sup> semester)	18
<b>Core Programme –</b>	<b>19</b>
B.Sc. Honours in Agriculture Degree	19
Agricultural Biology	19
Agricultural Chemistry	22
Agricultural Economics	25
Agricultural Engineering	27
Animal Science	30
Crop Science	33
<b>Advanced Programme –</b>	<b>35</b>
B.Sc. Honours in Agriculture Degree	35
Agricultural Biology	35
Agricultural Chemistry	39
Agricultural Economics	45
Agricultural Engineering	50

Animal Science	57
Crop Science	65
Common Courses	71
Examinations and Assessment	76
Eligibility to Apply	76
Course Attendance	76
Application Procedure	76
Examinations and Assessment Procedures	77
Evaluation Procedure	77
Scheme of Grading	78
Pass in a Course & Continuing Degree Programme	78
Assessment of Project	78
Assessment of Non-gradual Courses	79
Assessment of Independent Learning (IL)	79
Calculation of Grade Point Average (GPA)	79
Award of Class	80
Required FGPA for the award of class	80
Repeating the Examination	80
Absence from Examinations	80
By- Laws for the examination procedure, offences and punishments	81
General	81
PART - I	81
Examination Procedure	81
PART – II	85
Examination Offences and Punishments	85
Examination Offences committed by the Candidates	86
Classification of Offences	86
Procedure	86
Final Decision	87
Appeals Board	87
Notes for the Final Year Research Project	88
Supervisors and Research Advisors	88
Guidelines for the Preparation of Research Project Report	88
Affiliated Units to the Faculty of Agriculture	89
University Library	89
Department of English Language Teaching (DELT)	90
Centre for Information and Communication Technology (CICT)	91
Faculty Computer Unit	91
Physical Education/Sports Facilities	91
Career Guidance Unit	91
University Health Centre	92
Faculty Student's Union	93
Student Counseling Service	93

# **Eastern University, Sri Lanka**

## **Introduction**

The Eastern University, Sri Lanka was established on the 1<sup>st</sup> October 1986 by a University Order dated 26<sup>th</sup> September 1986 issued under Section 2 of the Universities Act No: 16 of 1978. The University was preceded by the Batticaloa University College established on the 1<sup>st</sup> August 1981 to fulfill the long felt need for the development of the Higher Educational Institution in the Eastern Province of Sri Lanka. The Batticaloa University College began with two Faculties: The Faculty of Agriculture and the Faculty of Science, both these faculties were affiliated to University of Peradeniya. In October 1986, the Batticaloa University College was elevated to the status of University under the name of Eastern University, Sri Lanka. Two new Faculties, the Faculty of Commerce and Management and the Faculty of Cultural Studies were established in 1988. The Faculty of Cultural Studies was then expanded and renamed as the Faculty of Arts and Culture in 1991. In 2005, the Faculty of Health Care Sciences was established in the University and located in Batticaloa town. A campus of the Eastern University functions at Trincomalee with the Faculties of Applied Sciences and Communication and Business Studies. The Swami Vipulananda College of Music and Dance was established in 1981 and was subsequently handed over to the Eastern University in 2001. The SVCMD was then converted to a separate Institute and renamed as Swami Vipulananda Institute of Aesthetics Studies (SVIAS) offering degree programmes in Music and Dance. The Faculty of Technology was started in 2014 as sixth faculty of Eastern University, Sri Lanka.

## **Officers of the Eastern University, Sri Lanka**

Chancellor	<b>Dr.V.Vivekanandarajah</b> MBBS, MRCP, FRCP & FRCPE
Vice Chancellor	<b>Prof V Kanagasisingam (AMIPM-SL)</b> Ph D (PIM-USJP), M Sc. (Management) (USJP), BBA (Hons.) EUSL, CTHE (UoC), CRHEM (Thailand) Eastern University, Sri Lanka
Registrar	<b>Mr. A. Pahirathan</b> B Com., MBA
Bursar	<b>Mr. M. M. Mohamed Fareez</b> BBA (Hon), ACMA (UK), CGMA (USA), ACMA (SL)
Librarian	<b>Dr. W. J. Jeyaraj</b> Librarian Ph.D., B.A. (Hons.), PG. Dip. Edu., M.Ed., MLSc., ALA

## Faculty of Agriculture

### History

The Faculty of the Agriculture is one of the oldest Faculties of the Eastern University located at Vantharumoolai, Chenkalady. The Faculty was shifted to a new location at Palachcholai, Kaluwankerny on 29<sup>th</sup> June 2020. During the entire history, the Faculty had maintained uninterrupted, intense and sustained activities committed to the course of promoting the application of Agricultural Science for the benefit of the nation and the region as well. The Faculty comprises six Departments, over 40 academic staff and around 250 students. The Faculty at present offers Bachelor of Science Honours in Agriculture degree programme. In addition, the Faculty offers a number of postgraduate degrees leading to MSc in Agriculture, MSc in Food Processing Technology *etc.* There are many research students reading for their M.Phil and Ph.D degree programmes under the supervision of the senior academics in the Faculty. The Faculty and the staff have established strong links with both Sri Lankan and Foreign Organizations through various collaborative research programmes. Several members of the Faculty academic staff have been awarded national and international awards for their contribution in scientific research and development. Several members serve as research consultants and board members in many Governmental and Non-Governmental organizations.

With the significant contribution to strengthen the higher education in Agriculture in the University system, the Faculty of Agriculture of the Eastern University developed a full-fledged Faculty with the Departments namely *Agricultural Biology, Agricultural Chemistry, Agricultural Economics, Agricultural Engineering, Animal Science and Crop Science*. The Faculty has a well established Crop and Livestock farm, about 15 acres in extent for teaching and research purposes and for the issue of planting materials, livestock products and breeding stock of farm animals to the public. The Faculty farm also provides beneficial effects to uplift the knowledge in the farming activities of the farmers in the Eastern Province to favor the dissemination of knowledge. The Faculty is expected to serve as a catalyst for the agricultural and socio-economic development of the region. The agriculture education offered and the agricultural research pursued by the Faculty to cater the special needs of the region as indicated by the specific agro-climatic zone of the country. Therefore, the Faculty of Agriculture plays a vital role in the upliftment of the socio-economic standards of the predominantly rural population who depend largely on Agriculture.

### **VISION**

**“To be a centre of Excellence for higher learning and research in Agriculture to meet national and global needs”**

### **MISSION**

**“To produce graduates of the highest professional standard contributing towards technology enhancement, dissemination of knowledge and skills and involvement in sustained productivity in the agricultural sector of Sri Lanka”**

## Officers of the Faculty of Agriculture

Dean                                    **Dr. M. Pagthinathan**  
B.V.Sc., M.Phil. (UPDN), Ph.D. (UPM)

Assistant Registrar                **Mrs. M.F.U. Safaya Rifath**  
B.A. (Hon) (SEUSL), PDC (SEUSL)

## Heads of Departments

Agric. Biology                        **Dr (Mrs.) Niranjana Rodney Fernando**  
B.Sc. Agric. (EUSL), M.Phil. (UPDN)  
Ph.D. (TNAU)

Agric. Chemistry                    **Prof (Mrs.) P. Premanandarajah**  
B.Sc. Agric. (EUSL), M.Phil. (UPDN)  
Ph.D. (TNAU)

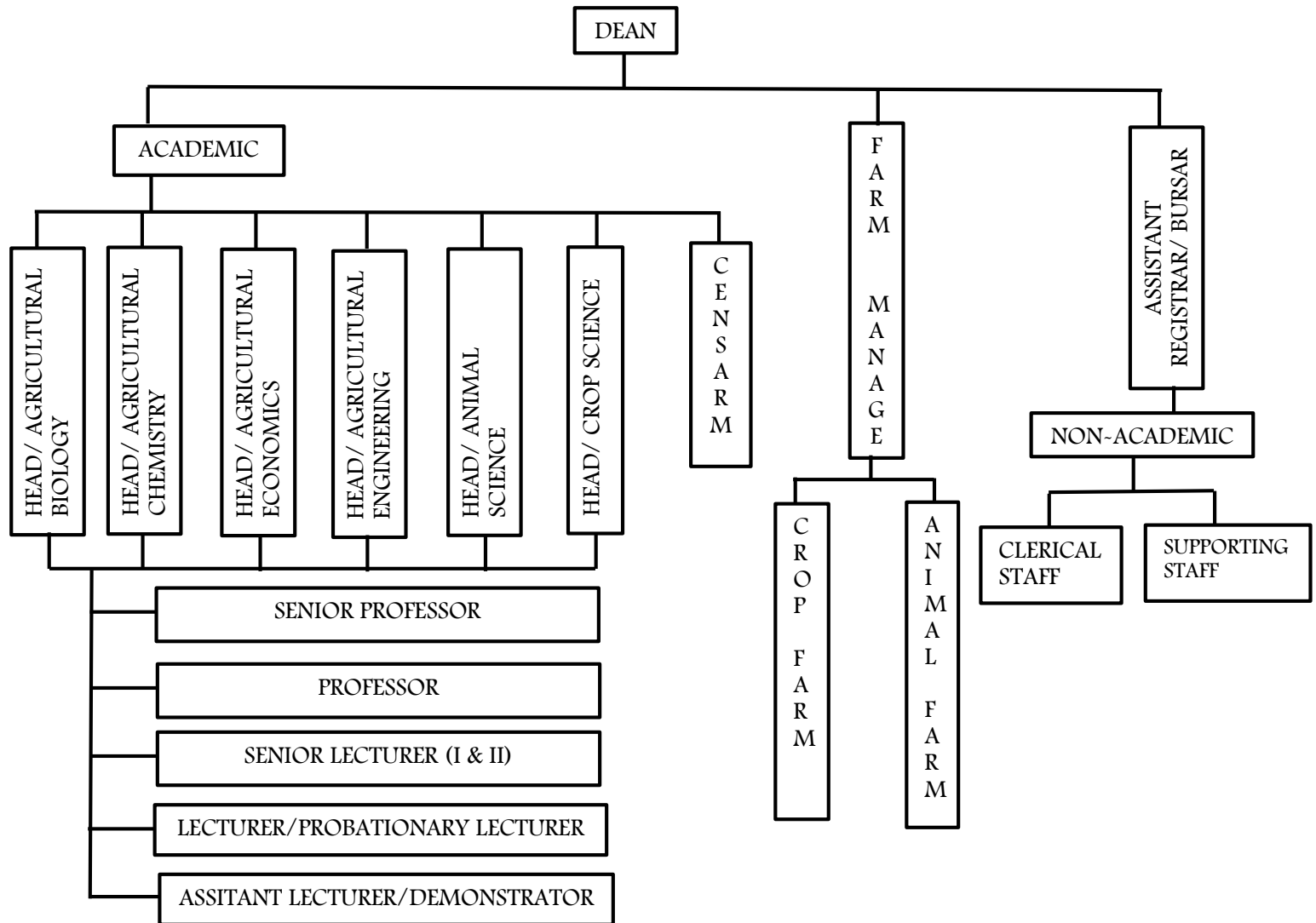
Agric. Economics                   **Dr (Mrs.) Thivahary Geretharan**  
B.Sc. Agric. (EUSL), M.Phil. (UPDN), Ph.D. (Massey)

Agric. Engineering                 **Mrs. E. Delina J. Prince**  
B.Sc. Agric. (EUSL), M.Phil. (UPDN)

Animal Science                      **Dr. M. M. Mahusoon**  
B.Sc. Agric. (EUSL), M.Phil. (UPDN), Ph.D. (UPDN)

Crop Science                         **Dr. T. Geretharan**  
B.Sc. Agric. (EUSL), M.Sc. (UPDN),  
M.Phil. (UPDN), Ph.D. (Massey)

# Organizational Chart of the Faculty



## **Faculty Board Members**

<b>Dr. M. Pagthinathan</b>	Dean/Agriculture
<b>Dr (Mrs.) Niranjana Rodney Fernando</b>	Head/Agricultural Biology
<b>Prof (Mrs.) P. Premanandarajah</b>	Head/Agricultural Chemistry
<b>Dr (Mrs.) Thivahary Geretharan</b>	Head/Agricultural Economics
<b>Mrs. E. Delina J. Prince</b>	Head/Agricultural Engineering
<b>Dr. M. M. Mahusoon</b>	Head/Animal Science
<b>Dr. T. Geretharan</b>	Head/Crop Science

## **Senior Professor**

Senior Prof. (Mrs). Thevaki Mahendran

## **Professors**

Prof. (Mrs). Thayamini. H. Seran

Prof. S. Sutharsan

## **Senior Lecturers ~ Grade I**

Dr. K. Premakumar

Dr. S. Mahendran

Dr. M. Sugirtharan

Mrs. Krishnal Thirumarpan

Mr. M. S. M. Nafees

Mr. R. Thivyatharsan

Mrs. Tharsinithevy Kirupananthan

Mr. S. Srikrishnah

Mrs. Brintha Karunarathna

## **Senior Lecturers ~ Grade II**

Mrs. Komathy Prapagar

Mrs. Laura Shiromi David

Mrs. Bawatharani Raveendrakumaran

Mr. K. Prasannath

Mr. M. Rajendran

## **Lecturer**

Mrs. Amuthenie Sugirtharan

## **Two members elected from the Probationary Lecturers**

Mrs. Nishanthi Vathshalyan

Mr. G. Hariharan

## **Appointed Members**

Dr. (Mrs.) M. Amirthalingam

Mrs. Premini Raviraj

Ms. Malathy Parasuraman

## **Two Student Representatives**

Mr. D. K. G. S. Wickramasinghe

Ms. P. A. P. N. Perera

## **Assistant Registrar**

Mrs. M. F. U. Safaya ~

## Members of the Academic Staff

### Department of Agricultural Biology

<b>Dr. S. Mahendran</b>	<b>B.Sc. Agric.</b> (UAS, Bangalore, India), <b>M.Sc.</b> (UJ, Sri Lanka), <b>M.Sc.</b> (Reading, UK), <b>Ph.D.</b> (UPDN, Sri Lanka)	Senior Lecturer Gr. I	Plant Physiology
<b>Dr. (Mrs.) Niranjana Rodney Fernando</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka), <b>Ph.D.</b> (TNAU, India)	Senior Lecturer Gr. I	Agricultural Entomology
<b>Mr. K. Prasannath</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer Gr. II	Plant Pathology
<b>Mrs. D. H. Shanika Komahan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka)	Lecturer (Probationary)	
<b>Mrs. Nishanthi Vathshalyan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka) <b>M.Sc</b> (UPDN, Sri Lanka)	Lecturer (Probationary)	
<b>Mr. G. Hariharan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka) <b>M.Sc</b> (UPDN, Sri Lanka)	Lecturer (Probationary)	

### Department of Agricultural Chemistry

<b>Snr. Prof. (Mrs). Thevaki Mahendran</b>	<b>B.Sc. Agric.</b> (UPDN, Sri Lanka), <b>Ph.D.</b> (Reading, UK)	Senior Professor	Food Processing & Preservation
<b>Prof. (Mrs). Punitha Premanandarajah</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka), <b>Ph.D.</b> (TNAU, India)	Professor	Soil Fertility & Plant Nutrition
<b>Dr. K. Premakumar</b>	<b>B.Sc. Agric.</b> (UPDN, Sri Lanka), <b>M.Sc.</b> (AIT, Thailand) <b>Ph.D.</b> (IARI, India)	Senior Lecturer Gr I	Postharvest Technology & Biochemistry
<b>Mrs. Komathy Prapagar</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer Gr II	Environmental Soil Science
<b>Mrs. Amuthenie Sugirtharan</b>	<b>B.Sc. Agric., M.Sc.</b> (EUSL, Sri Lanka)	Lecturer	Human Nutrition

### Department of Agricultural Economics

<b>Dr (Mrs.) Thivahary Geretharan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka), <b>Ph.D.</b> (Massey University, New Zealand)	Senior Lecturer I	Agricultural Extension
<b>Mrs. Krishnal Thirumarpan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Sc.</b> (UPDN, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer I	Resource and Environmental Economics & Agribusiness management
<b>Mrs.Tharsinithevy Kirupananthan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Sc.</b> (CMU, Thailand)	Senior Lecturer I	Agricultural Economics

### Department of Agricultural Engineering

<b>Dr. M. Sugirtharan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Sc.</b> (MPKV, India)	Senior Lecturer I	Irrigation & Water Management
<b>Mr. R. Thivyatharsan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer I	Environmental Engineering
<b>Mrs. Bawatharani Raveendrakumaran</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer II	Farm Mechanization & Process Engineering
<b>Mr. M. Rajendran</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer II	Water Resources Management
<b>Mrs. E. Delina J. Prince</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Sc.</b> (UPDN, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer II	Geospatial Technology
<b>Mr. G. Niroash</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Sc.</b> (UPDN, Sri Lanka)	Lecturer (Probationary)	

### Department of Animal Science

<b>Dr. M. Pagthinathan</b>	<b>B.V.Sc.</b> (UPDN, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka), <b>Ph.D.</b> (UPM, Malaysia)	Senior Lecturer Gr I	Animal Health Care, Reproductive Physiology, & Dairy Technology
<b>Dr. M. M. Mahusoon</b>	<b>B.Sc. Agric., M.Phil. Ph.D.</b> (UPDN, Sri Lanka)	Senior Lecturer Gr I	Agrostology & Animal Nutrition
<b>Mr. M. S. M. Nafees</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer Gr I	Aquaculture & Aquatic Bio- resources Management
<b>Mrs. Laura Shiromi David</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	Senior Lecturer Gr II	Poultry Science & Technology
<b>Mrs. I. Sanjayaraj</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka)	Lecturer (Probationary)	Livestock Breeding

### Department of Crop Science

<b>Prof.(Mrs).Thayamini H. Seran</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Sc.</b> , <b>Ph.D.</b> (UC, Sri Lanka)	<b>Professor</b>	Horticulture & Plant Biotechnology
<b>Prof. S. Sutharsan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Sc. Agric.</b> , <b>D. Agric.</b> (NU, Japan)	<b>Professor</b>	Agronomy & Sustainable Agriculture
<b>Mr. S. Srikrishnah</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	<b>Senior Lecturer Gr I</b>	Floriculture & Landscape, Protected Agriculture
<b>Dr. T. Geretharan</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Sc.</b> (UPDN, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka), <b>Ph.D.</b> (Massey University, New Zealand)	<b>Senior Lecturer Gr II</b>	Crop Ecology, Agroforestry & Weed Management
<b>Mrs. Brintha Karunarathna</b>	<b>B.Sc. Agric.</b> (EUSL, Sri Lanka), <b>M.Phil.</b> (UPDN, Sri Lanka)	<b>Senior Lecturer Gr I</b>	Biostatistics
<b>Dr. R. Easwaran</b>	<b>B.Sc. Agric. Tech &amp; Mgt.</b> (Peradeniya), <b>M.Phil.</b> (Peradeniya), <b>Ph.D</b> (Michigan State University, USA)	<b>Lecturer (Probationary)</b>	

## **B.Sc. Honours in Agriculture Degree Programme**

### **Structure of the Academic Programme**

The academic programme leading to the degree of B.Sc. Honours in Agriculture is offered for a four-year duration and conducted under a semester based credit unit system. Considering the importance of English in higher learning and job opportunities, English is the medium of instruction throughout the degree programme.

The curriculum of the B.Sc. in Agriculture degree programme is revised periodically to suit the changing needs of the Agricultural sector and the technology transformation taking place in the global academic scenario. The latest revision of the curriculum for the B.Sc. in Agriculture degree programme offered by the Faculty took place in 2014 using a student centered learning outcome-based approach. In revising the curriculum, the Faculty not only was summative to the needs of the stakeholders, but also was innovative to adopt novelties to the curriculum considering the changes taking place in the global higher education arena.

### **Objectives of the Degree Programme**

The objectives of the B.Sc. in Agriculture degree are to:

- Impart knowledge and skills in Agriculture, Animal production, Sustainable Management, Agro-product Processing, Natural Resource Management, Socio-economic Development and Business Management.
- Produce graduates capable of making significant contributions for the overall development mainly focusing on Agriculture and allied activities.
- Identifying and analyzing the problems in Agriculture in farm, community, national and global level.
- Finding innovative, environmentally friendly, technologically appropriate, economically feasible and socially acceptable solutions for the challenges in the Agriculture.
- Becoming professionals in the areas of research, academia and management socially responsible with effective communication skills.
- Development of information and communication skills.
- Improvement of interpersonal, teamwork and leadership qualities.

## Graduate Profile

A graduate of B.Sc. in Agriculture shall bloom with sound knowledge in agriculture. The graduates shall be an effective leader with skilled communication and collaboration. The graduates are also expected to be a critical thinker, successful entrepreneur, team player, lifelong learner, efficient problem solver, responsible decision maker and competent innovator and creator. The graduates are expected to be able to manage cross-cultural situations by having features like social and environmental responsibility, balanced work life, and honesty and fairness.

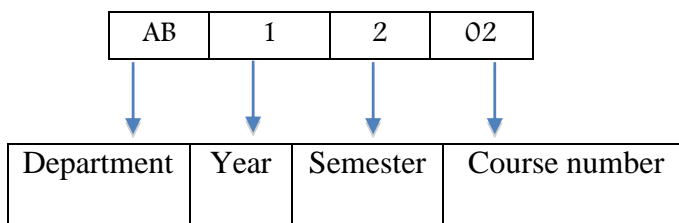
## Semester System

One semester consists of 15 weeks of academic programmes and examination period. Each course is taught and assessed within the same semester and end semester examinations, which will be conducted at the end of each semester. The four-year degree programme comprises eight semesters.

## Course Code

The course code includes a two-letter abbreviation indicates the name of the Department responsible for offering the course, followed by a four digit number denotes the year of study, semester and the serial number of the courses, respectively.

Eg: **AB 1202** Entomology denotes the second course offered by the Department of Agricultural Biology in the Second Semester of the First Year study programme.



## Abbreviations used in the Departments of Study

Name of the Department	Abbreviation
Agricultural Biology	AB
Agricultural Chemistry	AC
Agricultural Economics	EC
Agricultural Engineering	AE
Animal Science	AS
Crop Science	CS

## Credit Unit

One credit unit is equivalent to either 15 hours of lectures or 30 hours of practical classes or tutorial or assignments or fieldwork *etc.* approved by the Faculty Board. One credit unit has been assigned to a maximum student work of 50 hours to include Lectures, Practical and 'Independent Learning' (IL) approaches. To promote the independent learning skills, appropriate learning activities and time requirement were incorporated into the curriculum. Since the new curriculum was developed using the Student oriented approach based on the desired learning outcomes, the credit unit was restated based on the student workload. Course notation was made more descriptive, including the number of independent learning hours pertaining to each course in addition to the number of lecture hours and practical hours. The numbers following a course title indicate the number of credit units, the number of lecture hours, practical hours and independent learning hours respectively that are assessed during the course.

Eg:

- A 2 credit course of 15 hours of theory, 30 hours of practical and 55 hours of independent learning will be indicated as (2: 15/30/55).
- A 2 credit course of 30 hours of theory and 70 hours of independent learning will be indicated as (2: 30/00/70).
- A 2 credit course of 60 hours of practical and 40 hours of independent learning will be indicated as (2: 00/60/40).

## Structure of the Degree Programme

The eight-semester degree programme includes five semesters of core programme and three semesters of advanced programme. The core programme will be conducted from first semester to fifth semester comprises 98 compulsory credits inclusive of 10 Non Gradual Credits (NGC). In 6<sup>th</sup> and 7<sup>th</sup> semester a student should select 20 credits offered by the department in which the student is going to specialize and 4 common courses inclusive of 2 NGC, 2 credit units of Design and Analysis of Experiments or Social Research Methodology and 4 credit units of Industrial Training. In 7<sup>th</sup> semester the student should complete an industrial training equivalent to 4 credits. In 8<sup>th</sup> semester under the supervision of senior lecturer/s the student should carry out a research project equivalent to 6 credits relevant to the department in which student is specializing.

A student should complete a minimum of 133 credits inclusive of 13 NGC and 6 credits of research project during the four academic years of the degree programme. The Faculty offers advanced programmes in 6<sup>th</sup> and 7<sup>th</sup> semester to provide in depth knowledge and skills in the particular discipline. A student specializing in the Department of Animal Science should attend two audit courses, AS 3213 English for Animal Science - Level I and AS 4111 English for Animal Science - Level II included in 6<sup>th</sup> and 7<sup>th</sup> semesters respectively in addition to the 133 credits inclusive of 13 NGC.

## Common courses

To assist students to acquire satisfactory NGC courses are included in the core and advanced programme: proficiency in English, Basic Mathematics, Social Harmony,

Career Development, Basic Sinhala/Basic Tamil and Inter-Faculty Course. It is compulsory for every student to pass all the NGC courses during the degree programme to be eligible for the award of degree. Though 'Information and Communication Technology' is included as common course, it will be credited and considered for GPA calculation.

A farm practice course was designed to be conducted at University farm. Farm practice consisting primarily of practical, field visits and discussions are included to provide hands-on experience on the realities of farming. Further to strengthen professional skills and job opportunities for students, the courses have been formulated with in-built learning activities such as team working, communication, presentation and practical skills.

To familiarize students with professional Agricultural practices prior to graduation, Industrial/in-plant Training is compulsory. All students must complete 4 weeks of industrial training to be eligible for the award of the degree. It provides exposure in agricultural practices to develop professional skills and also assists students for future employment opportunities. The training should cover a range of activities like laboratory study and fieldwork.

During the past three decades of active contribution in higher education in Agriculture, Faculty designed advanced courses, course unit based curriculum, out-come based curriculum and introducing teacher-course evaluation, peer review, lesson planning and curriculum monitoring to improve the quality of the Agriculture degree programme in the University system of Sri Lanka. All these achievements were made due to the leadership and commitment of the devoted members of the Faculty from its inception.

### **Inter-Faculty Course**

The student should follow an inter-faculty course at 5<sup>th</sup> or 6<sup>th</sup> semester as NGC. The inter-faculty course will enhance the employability of students as well as cross-cultural competency.



## Courses in the Core Programme

### Bachelor of Science Honours in Agriculture degree

Semester	Course Notation	Courses	Credit Units
1100	AB 1101	Agricultural Botany	(2:15/30/55)
	AC 1101	Introduction to Soil Science	(2:15/30/55)
	AE 1101	Hydrology and Meteorology	(2:15/30/55)
	AE 1102	Applied Mathematics for Agricultural Science*	(1:15/00/35)
	AS 1101	Livestock Production and Agrostology	(2:15/30/55)
	CS 1101	Principles of Crop Production	(3:30/30/90)
	EC 1101	Principles of Agricultural Economics	(2:30/00/70)
	CC1101	Information and Communication Technology	(2:15/30/55)
	CC 1102	English (Level I) *	(1:15/00/35)
	CC 1103	Introduction to Social Harmony*	(1:15/00/35)
<b>Sub Total</b>			<b>15+ 3 NGC</b>
1200	AB 1201	Agricultural Microbiology	(2: 15/30/55)
	AB 1202	Entomology	(2: 15/30/55)
	AC1201	Nutritional Biochemistry	(2: 15/30/55)
	AE 1201	Farm Mechanization	(2:15/30/55)
	AE 1202	Applied Mechanics	(1:15/00/35)
	AS 1201	Anatomy and Physiology of Farm and Aquatic Animals	(2:15/30/55)
	CS 1201	Principles of Horticulture	(2:15/30/55)
	CS 1202	Seed Science and Technology	(2:15/30/55)
	EC 1201	Agricultural Extension and Rural Development	(2:30/00/70)
	CC 1201	English (Level II) *	(1:15/00/35)
	CC 1202	Career Development - Module 1*	(1:00/30/20)
	CC 1203/ CC 1204	Basic Sinhala*/ Basic Tamil*	(1:15/00/35)
<b>Sub Total</b>			<b>17 +3 NGC</b>
2100	AB 2101	Plant Physiology	(2:15/30/55)
	AB 2102	Principles of Genetics	(1:15/00/35)
	AC 2101	Soil Properties	(2:15/30//55)
	AC 2102	Basics in Soil fertility and Plant Nutrition	(1:15/00/35)
	AE 2101	GIS for Agriculture	(2:15/30/55)
	AS 2101	Applied Animal Nutrition	(2:15/30/55)
	AS 2102	Management of Non-Ruminants	(2:15/30/55)
	CS 2101	Floriculture and Landscape	(2:15/30/55)
	CS 2102	Introductory Statistics	(2:30/00/70)
	EC 2101	Agribusiness Management	(2:30/00/70)
	CC 2101	Career Development – Module 2*	(1:00/30/20)
<b>Sub Total</b>			<b>18+1 NGC</b>
	AB 2201	Principles of Crop Improvement Technology	(2: 15/30/55)
	AB 2202	Plant Pathology and Techniques	(2:15/30/55)
	AC 2201	Food Science and Technology	(2: 20/20/60)
	AC 2202	Human Nutrition	(2: 15/30/55)
	AE 2201	Irrigation and Water Management	(2:15/30/55)

2200	AE 2202	Environmental Engineering	(2:15/30/55)
	AS 2201	Management of Ruminants	(2:15/30/55)
	AS 2202	Fisheries and Aquaculture	(2:15/30/55)
	CS 2201	Agronomy of Field Crops	(2:30/00/70)
	CS 2202	Principles of Agroforestry	(1:15/00/35)
	EC 2201	Development Economics	(2:30/00/70)
<b>Sub Total</b>			<b>21</b>
3100	AB 3101	Tropical Field Entomology and Pathology	(1:00/30/20)
	AB 3102	Insect Pest Management	(2:15/30/55)
	AC 3101	Soil Quality Maintenance	(1:00/30/70)
	AC 3102	Value addition and Food Product Development	(2:00/60/40)
	AE 3101	Electronics I for Agriculture	(2:15/30/55)
	AS 3101	Practices in Farm Animal Production	(2:00/60/40)
	CS 3101	Crop Production Technology	(3:00/90/60)
	EC 3101	Organizations in Agricultural Development	(2:00/60/40)
	EC 3102	Rural Farm Survey	(2:00/60/40)
	DED 3023 or MGT 3063 or HRM 3043 or MKT 3023	<b>Inter-Faculty Courses*</b> Entrepreneurial Practices or Public Management or Organizational Change and Development or Service Marketing	(3:45/00/105)
<b>Sub Total</b>			<b>17 + 3 NGC</b>
3200	CC 3201	Career Development – Module 3*	(1:00/30/20)
	CC 3202	Scientific writing*	(1:15/00/35)
	CC 3203 or CC 3204 or CC 3205 or CC 3206	English for Specific Purpose* English for Agriculture or English for Agribusiness Management or English for Business Writing or English for Meetings and Presentation	(1:15/00/35)
	AB/ AC/ AE AS/CS / EC	Departmental Compulsory Courses	12 credits
	<b>Sub Total</b>		<b>12 +3 NGC</b>
4100	CS 4101 or EC 4101	Design and Analysis of Experiments or Social Research Methodology	(2: 30/00/70)
	CC 4102	Industrial Training	4 credits
	AB/ AC/ AE AS/CS / EC	Departmental Compulsory Courses	8 credits
<b>Sub Total</b>			<b>14 credits</b>
4200	AB/ AC/ AE AS/CS / EC – 4201	Research Project	(6:00/180/120)
<b>Sub Total</b>			<b>6 credits</b>
			<b>120 Credits</b>
			<b>13 NGC</b>

\*- Non Gradual

## Summary of Credit Units

### Core Programme

Departments	1 <sup>st</sup> Semester		2 <sup>nd</sup> Semester	3 <sup>rd</sup> Semester	4 <sup>th</sup> Semester	5 <sup>th</sup> Semester (Farm Practice)	TOTAL	
Agric. Biology	2		2+2	2+1	2+2	1 +2	16	
Agric. Chemistry	2		2	2+1	2+2	1+2	14	
Agric. Engineering	2	NGC 1- Math	2 +1	2	2+2	2	13 +	NGC ~ 1
Animal Science	2		2	2+2	2+2	2	14	
Crop Science	3		2+2	2+2	2+1	3	17	
Agric. Economics	2		2	2	2	2+2	12	
Common Courses	2 IT	NGC 1 – EN 1- SH	NGC 1 – EN 1 – CC 1 – BS/BT	NGC 1 – CC			2	NGC ~ 6
Inter-faculty Course	~	~	~	~	~	NGC 3 IFC	~	NGC – 3
Sub Total	15 + 3(NGC)		17+ 3 (NGC)	18+ 1(NGC)	21	17 + 3 (NGC)	88+ 10 (NGC)	

Third Year First Semester (5<sup>th</sup> Semester) - Farm Practice (By each Department)  
 (NGC – Non-Gradual Credit, EN – English, SH – Introduction to Social Harmony,  
 IT – Information and Communication Technology, CG - Career Development,  
 BS/BT –Basic Sinhala/Basic Tamil IFC – Inter-Faculty Course)

**Departmental Specialization  
(From 3<sup>rd</sup> year 2<sup>nd</sup> semester)**

	Total Allocated	Departmental allocation (Compulsory)	Common Courses		For the students specializing in the Department of Animal Science
			Credited	Non-Gradual Credit	
<b>6<sup>th</sup> Semester</b>	12 + 3 (NGC)	12	-	*01 + *01 + *01 (NGC)	****01
<b>7<sup>th</sup> Semester</b>	14	08+ **02	***04	-	****01
<b>8<sup>th</sup> Semester</b>	06	06 (Research Project)	-	-	-
<b>Sub Total</b>	<b>32 + 3 (NGC)</b>				
<b>Grand Total</b>	<b>120 + 13(NGC)</b>				

- \* - Career Development (1 credit), Scientific Writing (1 credit) and English for Specific Purpose (1 credit) – All the students should follow these courses, however, considered as NGC courses.
- \*\* - Design and Analysis of Experiments or Social Research Methodology (2 credits) - All the students should follow one of these courses, however, considered as credited courses.
- \*\*\* - Industrial Training (4 credits for 4 weeks, Departmental) - All the students should follow this course, however, considered as credited course.
- \*\*\*\* - English for Animal Science - Level I (1 credit) & English for Animal Science - Level II (1 credit) – These courses merely for the students specializing in the Department of Animal Science, however, considered as audit course.

**Note:**

- From third year second semester onwards departmental notation for special courses offered by the department.
- Design and Analysis of Experiment or Social Research Methodology (2 credits), Scientific Writing (1 credit), Career Development and Industrial Training are compulsory for all students.
- Inter-faculty course is compulsory for all students. A student can choose one of the courses listed in 3100 series under Inter-Faculty courses based on their interest. The inter-faculty courses were selected from the curriculum of the Faculty of Commerce and Management to enhance employability of the students.

## CORE PROGRAMME

### BACHELOR OF SCIENCE HONOURS IN AGRICULTURE DEGREE

#### AGRICULTURAL BIOLOGY

The Department of Agricultural Biology is committed to providing high quality education to the undergraduate students in advancing biological knowledge through teaching, research and training. The Department is dedicated to cover the spectrum of contemporary biological sciences from molecular aspects to field ecology. Subject coverage spans from knowledge on Plant Physiology, Plant Systematics, Plant Breeding, Genetics, Pathology, Microbiology, Entomology, Pest Management and Molecular Biology. The degree programme also provides extensive hands-on training on biology related laboratory and fieldwork. The students are provided with the opportunity to familiarize themselves in biological science with the national level research undertaken with the unique opportunity of working with ultra-modern, high-tech equipment.

No	Course Notation	Courses	Credit units
01	AB 1101	Agricultural Botany	(2:15/30/55)
02	AB 1201	Agricultural Microbiology	(2:15/30/55)
03	AB 1202	Entomology	(2:15/30/55)
04	AB 2101	Plant Physiology	(2:15/30/55)
05	AB 2102	Principles of Genetics	(1:15/00/35)
06	AB 2201	Principles of Crop Improvement Technology	(2:15/30/55)
07	AB 2202	Plant Pathology and Techniques	(2:15/30/55)
08	AB 3101	Tropical Field Entomology and Pathology	(1:00/30/55)
09	AB 3102	Insect Pest Management	(2:15/30/55)
<b>TOTAL</b>			<b>16</b>

#### **AB 1101 Agricultural Botany (2: 15/30/55)**

Morphology and taxonomy of the family Poaceae, vegetative and reproductive structures of cereal crops, sugarcane, rice, maize and sorghum. Salient features of brinjal, tomato and chillies under the family Solanaceae. Family Cucurbitaceae- vegetative and floral structures of pumpkin, cucumber and water melon. Family Fabaceae- groundnut, soybean, phaseolus sp., vigna sp., cowpea, green gram and black gram. Plantation crop- tea, Oil crops- coconut and castor, Spice crops- clove, cinnamon, vanilla, ginger, pepper and turmeric. Beverage crops- cocoa and coffee. Fruit crops- Families Rutaceae- citrus sp, Musaceae- banana and Caricaceae- papaya.

#### **AB 1201 Agricultural Microbiology (2: 15/30/55)**

General characteristics of microorganisms; Classification and morphology of microorganisms; Reproduction and nutrition of microorganisms; Microscopy; Microbial growth; Control of microorganisms; Microbial genetics; Microbial ecology and their interactions; Plant growth related soil microorganisms; Food related microorganisms; Biological control of plant pests and diseases.

**AB 1202 Entomology (2: 15/30/55)**

Introduction; phylum Arthropoda and its classification; external morphology and physiology of a typical insect, metamorphosis and its types; insect classification, significant characters of insect orders; with examples. Introduction to dichotomous key, insect damages and its mouthparts.

**AB 2101 Plant Physiology (2: 15/30/55)**

Osmosis, Free energy and the concept of water potential, Cell water relations, technical terms in plant water status, Absorption of water and root and stem pressures, Guttation, pathway of water through roots, The Ascent of sap, Mechanism of sap rise, Photosynthesis, early photosynthetic research, principles of light absorption by plants, photosystems, photochemical and biochemical reactions- C<sub>3</sub>, C<sub>4</sub> and CAM pathways, Photophosphorylation, Photorespiration, Transport and Partitioning, Phloem loading and unloading, Source- Sink relationship.

**AB 2102 Principles of Genetics (1:15/00/35)**

Introduction, Mendelian inheritance, Linkage and crossing over, Chromosomal behaviour and variations, Chromosome mapping, Introduction to cytogenetics, Mutation, Sex determination and sex linkage in plants and animals, Concepts of quantitative genetics, Hardy-Weinberg equilibrium and gene frequencies, Polygenic inheritance, Population genetics.

**AB 2201 Principles of Crop Improvement Technology (2:15/30/55)**

Introduction, Evolution of crop species, Centres of origin of crop species, Plant genetic resources, Methods of breeding field crops, Techniques in breeding, Selfing and crossing techniques, Screening for tolerance to biotic and abiotic stresses, Cytogenetics and polygenes in plant breeding, Biotechnological breeding, Importance of PGR and biodiversity in genetic improvement of plants.

**AB 2202 Plant Pathology and Techniques (2: 15/30/55)**

Introduction of plant pathology; Plant disease epidemiology; Mechanisms by which pathogens attack plants; Defense mechanisms of plants against pathogens; Stages in the development of plant disease; Modern techniques in plant disease diagnosis; General approach to plant disease management and control; Environmental effects on the development of plant diseases; Effects of pathogens on plant physiology; Genetics in plant disease.

**AB 3101 Tropical Field Entomology and Pathology (1: 00/30/20)**

Identification of insect and mite pests and diseases of vegetable and fruit crops, rice, coconut and stored products; Their biology and damage; Other important vertebrate and invertebrate pests of crops; Postharvest diseases of crops.

### **AB 3102 Insect Pest Management (2:15/30/55)**

Introduction to management practices of insect pests; cultural; mechanical; physical; biological; chemical; Integrated Pest Management and current trends in pest management. Contribution of eco friendly management practices in agriculture.



## AGRICULTURAL CHEMISTRY

The Department of Agricultural Chemistry consisting of the two main divisions: Food Science and Soil Science. Considerable attention has been given to Food Science and Technology as a discipline during the past few decades by universities worldwide due to its industrial and contemporary importance. The importance of soil as a natural resource has long been recognized by people and along with water and atmosphere, soil act as the life support system of our planet earth. The scientific study of soil started with the rapid development of agriculture and it is now considered as a subject with applications in agriculture, forestry, engineering and environmental sciences. The Department laboratories are well equipped for teaching, research and other experimental needs of the Department. Research in the Department reflects the wide range of disciplines encompassed by Food Science and Soil Science.

No	Course Code	Course Title	Credit Units
01	AC 1101	Introduction to soil science	(2:15/30/55)
02	AC 1201	Nutritional Biochemistry	(2: 15/30/55)
03	AC 2101	Soil Properties	(2:15/30//55)
04	AC 2102	Basics in Soil fertility and plant nutrition	(1:15/00/35)
05	AC 2201	Food Science and Technology	(2: 20/20/60)
06	AC 2202	Human Nutrition	(2:15/30//55)
07	AC 3101	Soil quality maintenance	(1:00/30/70)
08	AC 3102	Value addition and Food Product Development	(2:00/60/40)
Total			14

### AC 1101 Introduction to Soil Science (2: 15/30/55)

Chemical and mineralogical Composition of the earth crust, weathering processes: Mechanical (disintegration) and chemical (decomposition) weathering, Soil forming factors (Parent material, Climate, Topography or relief, Biotic, Time). Processes of soil formation (additions, losses, translocation and transformation), Importance of soil forming factors, Soil profile, aerial photography, remote sensing, soil survey.

### AC 1201 Nutritional Biochemistry (2: 15/30/55)

Classification of Nutrients- Carbohydrates- structures, properties and reactions, Lipids- structures, properties and reactions Proteins - structures, properties and reactions, Nucleoproteins - structures, properties and reactions, Enzymes- properties, classification, activity and inhibition, Vitamins- structure, properties, deficiency symptoms, and Co-enzyme relationships, Minerals, Digestion and energy relationships, Carbohydrate metabolism, Lipid metabolism, Protein metabolism, Metabolic interrelationships. Methods of Instrumentation in

Biochemical Analysis. Qualitative and Quantitative Analysis of Carbohydrates, Lipids and Proteins.

**AC 2101 Soil Properties (2: 15/30//55)**

Soil Physical Properties: Soil texture, architecture, soil density, porosity, soil colour, soil water, hydrology, aeration, and temperature, define the characteristics and behavior of soil water. Soil physical problems, management practices to overcome soil physical problems. Soil Chemical Properties: Structure & Function of Clay Minerals, Soil Organic Matter, Cation Exchange Reactions and Base Saturation, Soil Acidity & Buffer Capacity. Soil Biology: Soil Microbial Community, Soil Microbial Community Interactions with Plant Roots.

**AC 2102 Basics in Soil Fertility and Plant Nutrition (1: 15/00/35)**

Introduction to plant growth and nutrients. Essential plant nutrients. Chemistry and availability of major, secondary and selected minor elements in the soil. Nutrient uptake mechanism by plants. Functions of plant nutrients, deficiency and toxicity symptoms.

**AC 2201 Food Science and Technology (2: 20/20/60)**

Principles of fresh food storage: Properties of foods and processing theory, Raw material preparation, size reduction etc., Processing and preservation by heat: Blanching, pasteurization, sterilization, UHT processing, canning, extrusion cooking, and micro wave heating. Processing and preservation by low Temperature: refrigeration, freezing, CA and MA. Food irradiation, Processing and preservation by drying; sun drying, spray drying, drum drying, and freeze drying. Ultra filtration and reverse osmosis. Processing and preservation by non-thermal methods: High pressure, pulsed electric field, hurdle technology. Application of microorganism in food processing and preservation. Dairy Technology, Cereal Technology, Food Microbiology, Quality control.

**AC 2202 Human Nutrition (2: 15/ 30/55)**

Food Groups and Food Pyramid, Energy giving, Body building and Regulatory foods, Nutritional aspects of cereals and tubers, pulses and animal proteins, protein quality, fruits and vegetables, fats and oils, Role of Fiber in Nutrition. Beverages, Vegetarianism, Organic Foods, Junk Foods and Functional Foods. Food Poisoning, Food Allergy, Toxicants in foods, Losses of food and nutrients during processing and cooking. Balanced Diet, Breast feeding and Formula feeding, Nutritional Disorders (Nutritional Deficiency Diseases and Non Communicable Diseases), Assessment of Nutritional Status in Human.

**AC 3101 Soil Quality Maintenance (1: 00/30/70)**

Analysis and interpretation; the relative merits of traditional and novel techniques to manage soils will be evaluated.

## AC 3102 Value addition and Food Product Development (2: 00/60/40)

An Overview of Value Addition, Value Addition and Processing of food, General processing operations, Value-Added Food Processing, Value addition of Cereals, millets and Grain legumes, Value addition of Fruits and Vegetables, Value addition of Meat products, Value addition of Milk and milk products, Value addition of Sea foods, Value addition of Palmyra foods.



## **AGRICULTURAL ECONOMICS**

The Department of Agricultural Economics offers a broad scope of study of issues related to agriculture, food, managerial and resource economics. Though the Department is named as Agricultural Economics, it offers courses in two important disciplines in the field of agriculture, which are Agricultural Extension and Agricultural Management. The Department programme integrates in the discipline of Economic Development, Natural Resource Economics, Production Economics, Agribusiness Management, Marketing, Finance and Policy. The Department responsibilities are divided among teaching, extension and research. Significant emphasis is given to the international dimensions of these programmes.

No	Course Code	Course Title	Credit Units
01	EC 1101	Principles of Agricultural Economics	(2: 30/00/70)
02	EC 1201	Agricultural Extension and Rural Development	(2: 30/00/70)
03	EC 2101	Agribusiness Management	(2: 30/00/70)
04	EC 2201	Development Economics	(2: 30/00/70)
05	EC 3101	Organizations in Agricultural Development	(2: 00/60/40)
06	EC 3102	Rural Farm Survey	(2: 00/60/40)
<b>Total</b>			<b>12</b>

### **EC 1101 Principles of Agricultural Economics (2: 30/00/70)**

Introduction: Microeconomics Vs Macroeconomics, Marginal Analysis. Understanding consumer behavior, Theory of Consumer Behavior, Consumer Equilibrium and Market Demand, Measurement and Interpretation of Elasticities, Business and market equilibrium: Costs in Short Run vs Long Run, Production and Resource use, Important Production relationships, Economics of Input Substitution, Economics of Product Substitution, Market Equilibrium and Product Price, Imperfect Competition in Selling, Imperfect Competition in Buying, Macroeconomics in Agriculture, Composition and Measurement of Gross Domestic Product, Equilibrium National Income and Output.

### **EC 1201 Agricultural Extension and Rural Development (2: 30/00/70)**

Introduction to Agricultural Extension: Extension Philosophy, Objectives of Agricultural Extension, Extension fundamentals, Extension teaching methods, supporting activities for extension. Adoption and Diffusion of Extension: Adoption Process, Adopter categories, Diffusion and related factors. Extension Communication: Types of communication, Communication process, Communication models, Effective inter-personal communication, public

speaking, problems and effectiveness of communication, Agricultural Extension Organizations in Sri Lanka, Rural Development: Basic sociological Terms, Understanding the rural society, rural development and agricultural extension.

### **EC 2101 Agribusiness Management (2: 30/00/70)**

The role and organization of Agribusiness: Agribusiness in perspective, Managing the Agribusiness, The Organization of Agribusiness. Agribusiness scope and economic importance: Agricultural input sector, Marketing farm products. Financial management and control of the Agribusiness: Economics for managers. Tools for controlling Agribusiness, tools for management decisions in Agribusiness. Marketing in Agribusiness: The Agricultural Marketing System, Marketing Management in the Agribusiness Firm, Tools for Marketing Decisions, The Selling process. Operating the Agribusiness: Production planning in the agribusiness, Controlling production process in Agribusiness. Human Resource Management: Personnel Management, Managing Human Resources in Agribusiness

### **EC 2201 Development Economics (2: 30/00/70)**

Introduction: Economic development and Economic growth, Characteristics of Developing Countries, Obstacles of the Economic Development, Population and Development: Population pyramid, Population growth and demographic transition. Technology and Development: Role of technology in development, Transfer of technology, Human Resources and Development; Brain Drain with special reference to Sri Lanka, Agriculture and Economic Development, Theories of Economic Growth and Development, Agricultural Policies in Sri Lanka

### **EC 3101 Organizations in Agricultural Development (2: 00/60/40)**

Orientation/familiarizing of the functions of the government and non-government departments and organizations involved in agricultural development, Preparation of comprehensive reports about the organizational visit, Seminar presentation based on the report

### **EC 3102 Rural Farm Survey (2: 00/60/40)**

Consists of village study visit, Preparation of comprehensive reports about the village visit, Seminar presentation based on the village visit report



## AGRICULTURAL ENGINEERING

The Department of Agricultural Engineering handles all technological processes involved in the application of engineering to agriculture, food systems, natural resources, environment and related biological systems. Undergraduate degree programme has special emphasis on environmental protection and the biological interface of plants, animals, water and soils with the design and performance of environments, machines, mechanisms, processes and structures. The Department has well equipped laboratories including machinery workshop with modern facilities to cater the needs of the undergraduates. Meteorological station, Agro-technology park, Irrigation demonstration unit, Waste treatment technologies and Protected house are also maintained by the Department which are very helpful for the teaching and demonstration purposes.

No	Course Code	Course Title	Credit Units
1	AE 1101	Hydrology and Meteorology	2:15/30/55
2	AE 1102	Applied Mathematics for Agricultural Science	1 NGC
3	AE 1201	Farm Mechanization	2:15/30/55
4	AE 1202	Applied Mechanics	1: 15/00/35
5	AE 2101	GIS for Agriculture	2:15/30/55
6	AE 2201	Irrigation and Water Management	2:15/30/55
7	AE 2202	Environmental Engineering	2:15/30/55
8	AE 3101	Electronics I for Agriculture	2:15/30/55
<b>Total</b>			<b>13 + 1 NGC</b>

### **AE 1101 Hydrology and Meteorology (2: 15/30/55)**

Hydrological cycle: precipitation, interception, infiltration, runoff, groundwater. Measurement and estimation of rainfall, interception, infiltration and stream flow. Occurrence of groundwater, Types and properties of aquifers. Hydrograph: components of hydrograph, hydrograph separation, concept of unit hydrograph, its derivation and application, and hydrograph of runoff. Introduction to meteorology, Agro-meteorological field station, Measurement of temperature, relative humidity, wind direction and velocity, sunshine hours, radiation and evaporation, Interpretation and usage of meteorological data in agriculture, Evolution of climate zones in Sri Lanka.

### **AE 1102 Applied Mathematics for Agricultural Science (NGC) (1: 15/00/35)**

Basic terms and calculations of surface area, equations of straight lines and circle, common mathematical series, matrix algebra, limits of functions, differentiation, integration and application of differentiation and integration in agriculture.

### **AE 1201 Farm Mechanization (2: 15/30/55)**

Farm power sources, engine components, engine operation fundamentals, engine systems, soil tillage implements, plant protection equipment, equipment for irrigation, harvesting and threshing equipment, traction and traction theory, tractor stability, and depreciation of farm machinery.

### **AE 1202 Applied Mechanics (1: 15/00/35)**

Basic concepts and fundamental laws, force, moment and couple, resolution of force, resultant, Lami's theorem, free body diagram, two force and three force members, surface friction, Types of loads, types of supports, analysis of simple and compound beams, bending moment and shear force diagrams, centroid, moment of inertia of plane and composite figures, Modulus of Elasticity, Hook's law, stress and strain relationship.

### **AE 2101 GIS for Agriculture (2: 15/30/55)**

Introduction to GIS. History and overview of GIS and applications. Functional elements of GIS. Mapping concepts: Basics of Cartography, Map elements, Map scales and representation. Map projections and Coordinate systems. Data structure and Data acquisition. Usage of ArcGIS software: Basic functions and applications in ArcGIS software, Thematic mapping. Case studies in spatial decision making: detection of potential areas for agriculture, industries and reservation.

### **AE 2201 Irrigation and Water Management. (2: 15/30/55)**

Basic soil water concepts, Physical Properties of Soil: texture, structure, density, porosity and water content. Soil water potential, components, soil water retention curves. Water Movement in the Soils. Soil moisture constants, Measurements of soil moisture. Infiltration, factors affecting infiltration. Determination of bulk density, determination of hydraulic conductivity, infiltration rate. Evapotranspiration, measurement and estimation of evapotranspiration, crop water requirement, Irrigation requirements, Irrigation schedules, Effective rainfall. Measurement of irrigation water, sources of irrigation. Irrigation Systems: irrigation system network, major canal and headworks. Irrigation efficiencies and water use efficiencies. Irrigation methods: Border irrigation, Furrow irrigation, Basin and sub irrigation, Sprinkler irrigation, Drip irrigation. Needs and benefits of drainage.

### **AE 2202 Environmental Engineering (2: 15/30/55)**

Introduction to environment, environmental ethics, natural resources: air, water and land resources, problems to natural resources, renewable and non renewable energy sources, management of natural resources, introduction to environmental pollution: air, water, land, noise and thermal pollutions, global and national environmental issues, liquid waste: types, effects of wastewater on environment, treatment technologies, solid waste: types, effects of solid waste on environment, solid waste management, human impact on environment and its consequences and introduction to Environmental Impact Assessment (EIA).

## AE 3101 Electronics I for Agriculture (2: 15/30/55)

Matters, Energy levels in atoms, Classification of solid in terms of energy gap, Semiconductors, N-type and P-type semiconductors, P-N junction, Forward and reverse bias characteristics, Different types of diodes, Zener diode, LEDs, Photodiodes and solar cells, Diodes and Diode Circuits, Power Supply Circuits, Bipolar Junction Transistors (BJT) and its characteristics, Field effect Transistors (FET) and its characteristics, Transistor circuits and configurations, Applications of transistors.



## ANIMAL SCIENCE

The Department of Animal Science educates the undergraduates on farm animal production and processing techniques, and fisheries and aquaculture. The department facilitates scientific research and development for sustainable production of quality farm animal products and of fishes for food and recreational values without challenging the environment and jeopardizing the health and wellbeing of farm animals. It also provides educational leadership and inspiration through well-organized courses on animal physiology, animal nutrition, management of farm animals, aquaculture, livestock breeding, and meat and dairy sciences to effectively respond to the challenges faced by the global animal industries. The human resources of the department also engaged in conducting outreach programmes to impart the technical knowledge and skills to the farmers and general public in the region.

No	Course Code	Course Title	Credit Units
01	AS 1101	Livestock Production and Agrostology	(2:15/30/55)
02	AS 1201	Anatomy and Physiology of Farm and Aquatic Animals	(2:15/30/55)
03	AS 2101	Applied Animal Nutrition	(2:15/30/55)
04	AS 2102	Management of Non-Ruminants	(2:15/30/55)
05	AS 2201	Management of Ruminants	(2:15/30/55)
06	AS 2202	Fisheries and Aquaculture	(2:15/30/55)
07	AS 3101	Practices in Farm Animal Production	(2:00/60/40)
<b>Total</b>			<b>14</b>

### **AS 1101 Livestock Production and Agrostology (2: 15/30/55)**

Importance and current status of livestock industry in Sri Lanka; Resources for livestock development; Government programmes and organizational setup; Livestock feed industries; Analysis of present production levels and constraints of different livestock enterprises; Dairy production systems in different agro-climatic zones of Sri Lanka; Recommendations for the improvement of livestock industry in Sri Lanka; Potential and constraints for pasture production in different agro-climatic zones of Sri Lanka; Agronomic description of common pasture, fodder and legumes species; Establishment and management of pasture and legumes, pasture under coconut, mixed pastures; Role of legumes in pasture production; nitrogen fixation by pastures; defoliation and grazing management; Estimation of quantity and quality of forage; Conservation and management of herbage.

### **AS 1201 Anatomy and Physiology of Farm and Aquatic Animals (2: 15/30/55)**

Anatomy and physiology of nervous, respiratory, urinary, circulatory and digestive systems in farm animals, Anatomy and physiology of mammary gland,

anatomy of male and female reproductive systems and anatomical variations in farm animals, Gametogenesis and semen character, physiology of puberty, oestrus cycle, ovulation, fertilization, implantation, pregnancy and parturition in farm animals, physiology of post-partum period and resumption of ovarian activity, concepts in immunology, vaccines for farm animal, Endocrine system; location of glands and functions of hormones in farm animals. Basic anatomy and physiology of poultry digestive system and reproductive system. External and internal anatomy of teleost: respiratory system, circulatory system, buoyancy.

#### **AS 2101 Applied Animal Nutrition (2: 15/30/55)**

Principles of nutrition; Analysis of nutrients and feedstuffs: sampling for analysis, proximate analysis; Gastrointestinal tract and nutrition: anatomy and function of the GI tract of livestock and fish, rumen digestion; Nutrient metabolism in ruminants and non-ruminants: water, carbohydrate, lipids, protein and amino acids, energy metabolism, minerals, vitamins; Feedstuffs: classification of feedstuffs, feed additives, anti-nutritional factors; Feed formulation; Dairy cattle nutrition: utilization of metabolizable energy, feed and feeding standards during reproduction and lactation, sources of protein and other nitrogen compounds, evaluation of protein, synthesis and estimation of microbial protein and by-pass protein; Goat nutrition; Swine nutrition: nutrition during pregnancy, pregnancy anabolism, nutrition of lactating sow, breeding boar, weaning of piglets, feeding of growers and finishers; Poultry nutrition: importance of calorie to protein ratio, feeding at different stages of growth; Rabbit nutrition; Nutritional requirements of farmed fishes: basic principles of fish nutrition, role of carbohydrate, fat, protein, mineral and vitamins.

#### **AS 2102 Management of Non-Ruminants (2: 15/30/55)**

Poultry management: Introduction; Breeds of poultry; egg selection and incubation process; classes and grades of eggs and poultry; brooding practices; management of growing, laying, breeding and broiler chickens: housing and spacing, feeding, light management, ventilation, culling practices, vaccination, litter management, debeaking, record keeping and other special managements; Management of Duck and Turkeys for egg and meat purposes. Swine management: Introduction, swine production systems; swine breeds; economic traits and selection; feeding; housing; breeding; management practices during and after farrowing period; common reproductive problems; common health problems and control measures.

Rabbit management: Introduction; rabbit breeds; housing; feeding; breeding; kindling; weaning; handling rabbits; sexing rabbits; identification method; castration; common health problems and control measures.

#### **AS 2201 Management of Ruminants (2: 15/30/55)**

Cattle and Buffaloes: Breeds and selection criteria for different farming situations. Rearing systems of farm animals. Housing of farm animals. Care at parturition, Management of calf, heifer, pregnant, milking cow, dry cow and stud bull, beef cattle management, disease control, preventive measures and treatment, Management of buffalo, establishment and operation of a dairy farm and beef ranch. Clean milk production. Milking management, Machine milking and hand

milking. Introduction reproductive techniques in farm animals. Definition of climate -classification of climatic regions - Climatic factors-assessment of climate - Study of climatic factors in relation to animal production. Goat and sheep: Importance, characteristics of breeds, potential and problems of goat and sheep rearing in Sri Lanka, systems of rearing, housing, disease control, feeding of young and adult stock. Feeding to be followed in feeding and watering- feeder space, waterer space, Designing feeders and waterers. Stocking rate and pasture improvement and utilization management under stall fed conditions, farm records for better management; management for efficient production of wool and mohair.

#### **AS 2202 Fisheries and Aquaculture (2: 15/30/55)**

Current status of fisheries and aquaculture: Significance of aquaculture and fisheries, Fish consumption and use, Fisheries and aquaculture productions; Aquatic resources: Aquatic ecosystems and biomes, Aquatic habitats and communities, Applied hydrobiology - production biology; Fisheries: Definition and classification of fisheries, Fish introductions and fishery development in Sri Lanka, Fisheries management of Sri Lanka, Fishing methods and equipment; Aquaculture: Definition and classification of aquaculture, General principles of aquaculture, Aquaculture engineering and construction, Definition and classification of fish ponds, Types and elements of fish ponds, Water quality management in aquaculture, Water quality parameters and their impacts on aquaculture, Water quality management; Fish feeding in aquaculture: Enhancement of natural food production, Feeding; Fish propagation: General aspects of fish reproduction, Larval development, Induced spawning of carps; General principles of diseases in aquaculture: Philosophy of disease control, Generalized disease management techniques, Major diseases.

#### **AS 3101 Practices in Farm Animal Production (2: 00/60/40)**

Hands-on practices: management of cattle, buffalo, goat, sheep, chicken, duck, quails, turkey, swine and rabbits, management of aquaculture ponds, feeding trials; Hands-on practices in establishment of pasture and fodders: mixed cropping, fertilizer trials; Hands-on practices in processing of dairy and meat products: yoghurt, curd, cheese, butter and ghee making, preparation of barbecue, sausages; Field study to identify technical and socioeconomic problems in small- and medium-scale livestock, poultry and aquaculture farms; Field study to analyze costs and benefits of livestock, poultry and aquaculture farming practices; Exposure visit to commercial livestock, poultry, and fish farms and breeding centers operated in the country; Seminars to present the observations and suggestions to improve the present farm animal production.

## CROP SCIENCE

Crop Science is one of the basic disciplines in the Agriculture and thus represents the core of the Faculty of Agriculture. In principle, the Department of Crop science deals with agronomic, ecological and harvesting aspects of all plant species which are of nutritional, industrial, medicinal and environmental importance. Major emphasis is placed in maintaining an appropriate balance between farming and environment with the aim of conserving the environment while sustaining the crop productivity under constantly changing socio-economic needs. The Department consists of a teaching laboratory, research laboratory, plant tissue culture laboratory and crop farm which are modestly equipped to cater to the ongoing teaching and research programmes of the Department.

No	Course Code	Course Title	Credit Units
01	CS 1101	Principles of Crop Production	(3:30/30/90)
02	CS 1201	Principles of Horticulture	(2:15/30/55)
03	CS 1202	Seed Science and Technology	(2:15/30/55)
04	CS 2101	Floriculture and Landscape	(2:15/30/55)
05	CS 2102	Introductory Statistics	(2:30/00/70)
06	CS 2201	Agronomy of Field Crops	(2:30/00/70)
07	CS 2202	Principles of Agroforestry	(1:15/00/35)
08	CS 3101	Crop Production Technology	(3:00/90/60)
Total			17

### **CS 1101 Principles of Crop Production (3: 30/30/90)**

Introduction to Agriculture, Importance of crop production, Introduction to major sectors of agriculture, Agro-climate and Agro-Ecological Zones of Sri Lanka, classification of crops, Factors influence crop production, Plant nursery management techniques, Crop establishment techniques and field management, Crop Fertigation, Weed and weed management strategies, Composting, Traditional and modern crop production technologies, Plant population and geometry, Crop Growth Analysis, Yield attributes and yield improvement.

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

Introduction to Horticulture, Plant propagation of Horticulture crops, Vegetative propagation techniques-cutting, grafting, budding and layering, Specialized Horticultural practices like notching, girdling, bending, ringing, thinning, root pruning etc. Use of plant growth regulators, Vegetative reproducing structures, Nursery management, Introduction to pomology and olericulture.

### **CS 1202 Seed Science and Technology (2: 15/30/55)**

Introduction, Aims and role of seed technology, Importance of seeds and their uses, Flowering and seed formation, Stages of seed development, Factors affecting seed development, Characteristics of good seed, lifespan of seeds (seed longevity),

Dormancy, Physiology of germination, Seed viability, Seed and seedling vigour, Distinction among viability, vigour and dormancy, Seed deterioration, Classes of seeds, Seed production techniques in self and cross-pollinated crops and storage.

### **CS 2101 Floriculture and Landscape (2: 15/30/55)**

Introduction, Cultivation and post harvest management of selected cut flowers and ornamental foliage plants, Importance of landscaping, Principles and elements of landscaping, Selection of suitable soft and hard landscape materials, Landscape designing, Field visit.

### **CS 2102 Introductory Statistics (2: 30/00/70)**

Definitions and importance in Agriculture, Sampling methods, Frequency distribution, Central tendency and dispersion, Probability distributions, Hypothesis test-one sample and two samples, Chi-square test, Simple linear regression and correlation, Analysis of variance.

### **CS 2201 Agronomy of Field Crops (2: 30/00/70)**

Present status and importance of field crops in Sri Lanka, Ecological requirements, varieties, land preparation, crop establishment methods, water management, nutrient management, harvesting and post-harvest operations. Special management practices. Present research in field crops.

### **CS 2202 Principles of Agroforestry (1: 15/00/35)**

Introduction, Definitions, concepts and role of agro forestry, Classification and characteristics of agroforestry systems and practices, Multipurpose trees and shrubs, Species selection, interactions in tree-crop systems, Designing, sustainable management and evaluation of agro forestry, Forest farming, Social forestry practices, Agro forestry practices in Sri Lanka.

### **CS 3101 Crop Production Technology (3: 00/90/60)**

In this course, each student will be allotted a plot depending upon the availability of the resources for raising suitable crops of the dry zone during *maha/yala* season as recommended by the course teacher. The plot will be given from the time of preparation of land until the harvest of crop. Each student will carry out all important field operations independently or in-group under the supervision and guidance of the course teacher. Students will be visiting the nearby agricultural villages for field observation of cultivation systems adopted by the farmers, technical and socio-economic constraints of cultivation of crops and reasons for adopting or not adopting latest technologies. The student will have to work in his/her allotted plot in regular specified credit hours and during spare time as per requirement of the agricultural operations for the crop in time. A report should be submitted at the end of the semester for evaluation. In addition, students will visit to agricultural institutions, research stations and other agricultural support service centre and they will have to submit individual report on field visit as a part of farm practice course.

## ADVANCED PROGRAMME

### Bachelor of Science Honours in Agriculture degree

The advanced programme of the Bachelor of Science Honours in Agriculture degree consists of the advanced courses, each providing in-depth knowledge and skills unique to a particular discipline. Each advanced programme has a minimum total of 26 + 2NGC compulsory credit units. A student can select an advanced programme of his/her choice during the 6<sup>th</sup> and 7<sup>th</sup> semester. In 6<sup>th</sup> semester a student should select 12 credit units offered by the department in which he/ she is going to specialize and 2ncompulsorily 1 non gradial credited scientific writing and career guidance. In 7<sup>th</sup> semester a student should select 8 credit units offered by the department in which he/ she is going to specialize and compulsorily 2 credit design and analysis of experiment or social research methodology and 4 credit industrial training. In 8<sup>th</sup> semester student should do 6 credited research project relevant to his/her specializing department under the supervision of senior lecturer/s from the department in which he/ she is going to specialize.

### AGRICULTURAL BIOLOGY

The Department of Agricultural Biology offers the advanced courses in the fields of Plant Physiology, Genetics, Crop Breeding, Plant Pathology, Agricultural Microbiology, Applied Entomology and Pest Management. The programme also provides extensive hands-on training on biology related laboratory and field work. The students will learn the major physiological processes in plants, principles and concepts of genetics, different techniques in plant breeding, plant disease and insect pests diagnosis, physiological and morphological aspects of insect, effective and advanced techniques in pest management and molecular applications in developing resistant crop varieties. The course has a large component to prepare the student for further graduate courses in this field and a professional career in the field of Agricultural Biology. After successful completion, the students will become conversant in all the aspects of Agricultural Biology and have the ability to critically analyze and effectively solve the related problems in research and development in Agriculture.



Course Code	Course Title	Credit Units
<b>6<sup>th</sup> Semester</b>		
AB 3201	Plant Resistance to Pest	(2:15/30/55)
AB 3202	Cell Biology	(2:15/30/55)
AB 3203	Breeding Strategies of Economical Crop	(2:15/30/55)
AB 3204	Water Relations of Plants	(2:15/30/55)
AB 3205	Clinical Plant Pathology	(2:15/30/55)
AB 3206	Recombinant DNA Technology	(2:15/30/55)
<b>7<sup>th</sup> Semester</b>		
AB 4101	Advanced Plant Physiology	(2:15/30/55)
AB 4102	Advanced Plant Pathology	(2:15/30/55)
AB 4103	Insecticide Toxicology	(2:15/30/55)
AB 4104	Biological Control of Insect Pests	(2:15/30/55)
AB 4105	Plant Genetic Resources and Conservation	(2:15/30/55)
AB 4106	Plant Microbes Interactions	(2:30/00/70)
AB 4107	Stress Physiology	(2:15/30/55)
AB 4108	Introductory Nematology	(2:15/30/55)
AB 4109	Plant Virology	(2:15/30/55)
AB 4110	Quantitative Genetics	(2:15/30/55)

#### **AB 3201 Plant Resistance to Pest (2: 15/30/55)**

Insect-plant relations, basic theories of plant immunity, types of resistance, bases of resistance, the protective effects and mechanisms of plants before and after the invasion of the organism in plant tissues, host plant selection by phytophagous insects, role of plant resistance in Integrated Pest Management.

#### **AB 3202 Cell Biology (2: 15/30/55)**

Review of Basic concepts, Bio membranes and cell organizations; membrane potential: ionic equilibrium, ionic steady state; membrane trafficking; ligand gated ion channels; structure and function of cytoskeleton; Protein tertiary structure and functions, protein movement, secretion and endocytosis; Cell cycle; Intracellular messengers, Cell Signalling & Signal Transduction and homeostasis.

#### **AB 3203 Breeding Strategies of Economical Crops (2: 15/30/55)**

Breeding methodologies of rice, field, vegetable and fruit crops, visits to Research stations and Institutes to understand the breeding procedures.

#### **AB 3204 Water Relations of Plants (2: 15/30/55)**

Cell water relations, Mechanism of osmosis, osmotic adjustment, absorption of water, factors affecting water absorption through roots, Efficiency of root systems

in absorption, resistances to water movement in the soil-plant system, soil vs root resistance, environmental factors influencing absorption of water, energy relations, resistances to diffusion, water relations during drought, Effects of water stress on plants.

#### **AB 3205 Clinical Plant Pathology (2: 15/30/55)**

Economic significance of clinical plant pathology; Sterilization of laboratory items; Isolation of plant pathogens; Culturing of microorganisms; Storage of microorganisms; Identification of plant pathogens; Inoculation of pathogens; Microscopic techniques; Plant disease diagnostic techniques.

#### **AB 3206 Recombinant DNA Technology (2: 15/30/55)**

Overview of the structure and roles of DNA, RNA and protein molecules, Genomes, genome sequencing and molecular biology methods including PCR, Cloning and manipulating DNA sequences, Vectors and hosts for expressing recombinant proteins, Transfection and selection of recombinant cells, Tools of rDNA Technology: PCR, electrophoresis, electroporation and biolistic bombardment, blotting techniques.

#### **AB 4101 Advanced Plant Physiology (2: 15/30/55)**

Plant hormones, methods of biological and chemical assay for auxin, biosynthesis and metabolism of IAA, physiological effects, mechanism of IAA action, Gibberellins- Occurrence and distribution, Metabolism and action, GA and growth, Absciscic acid- Bioassay and physical methods of measurement, effects of Absciscic acid on growth, biosynthesis. Circadian rhythms, endogenous and exogenous control of rhythms, rhythms of CO<sub>2</sub> metabolism, Effects of light and temperature on photosynthesis, pigments of photosynthesis, types and occurrence, phytochrome as a photoreceptor, photomorphogenesis.

#### **AB 4102 Advanced Plant Pathology (2: 15/30/55)**

Phyto-pathological concepts; Biochemical and molecular basis of pathogenesis and virulence; Biochemical aspects of plant defence mechanisms: Molecular methods for detection of plant pathogens; Integrated disease management; Postharvest pathology; Current trends in plant pathology.

#### **AB 4103 Insecticide Toxicology (2: 15/30/55)**

Historical aspects of insecticides, major groups of insecticides, mode of action of insecticides, chemical nature of insecticide groups, selection of insecticides in IPM, environmental impact of insecticides; resistance development in insects, insecticides residues, pest resurgence.

#### **AB 4104 Biological Control of Insect Pests (2: 15/30/55)**

Bio-control agents, bio-control strategies; classical, augmentation and conservation, mode of action of microbial insecticides, commercial products of bio-control agents, integrated biological control, genetic improvement of bio-control agents, multitrophic interaction.

#### **AB 4105 Plant Genetic Resources and Conservation (2: 15/30/55)**

Introduction; Basic principles on plant genetic resources conservation; Strategies of plant genetic resources conservation; choice of conservation strategies; Species vs habitat or ecosystem based conservation; *In situ* conservation; *Ex situ* conservation; Institutes involved in plant genetic conservation; Design and management of gene bank facilities.

#### **AB 4106 Plant-Microbe Interactions (2: 30/00/70)**

General concepts; Host-pathogen recognition: Beneficial interactions: Legume-Rhizobia symbiosis, PGPR, Mycorrhiza; Pathogenic systems: Fungal, Bacterial and Viral pathogenicity; Mechanisms of disease resistance; Recent developments in plant-microbe interactions.

#### **AB 4107 Stress Physiology (2: 15/30/55)**

Biological stress and biological strain, stressful environments- Deserts and other dry areas, Tundras and cold areas, Drought stress, effects of drought on growth and yield, on ultrastructure, on photosynthesis. Nitrogen metabolism under water stress, Hardening (Acclimation). Mechanisms of drought resistance, Temperature stress, Effects on membranes, effects on root processes, Lower temperature limits for survival and growth, High temperature stress, Heat resistance in plants. Salt stress and salt resistance, Acidic soils.

#### **AB 4108 Introductory Nematology (2: 15/30/55)**

Morphology and anatomy of nematode; inner body tube, esophageal glands of nematode, male reproductive system of nematode, biology, taxonomy and classification of plant parasitic nematode, identification of important parasitic nematodes, entomophilic nematodes.

#### **AB 4109 Plant Virology (2: 15/30/55)**

Structure, nomenclature and taxonomy of plant viruses; Transmission of plant viruses; Replication of viruses; Plant viral diseases: Identification and Control; Detection techniques: Conventional, immunological and molecular biological; Viroids and phytoplasma.

#### **AB 4110 Quantitative Genetics (2: 15/30/15)**

Population Genetics Review; Continuous and Discrete Variation; Quantitative and qualitative characters; Environmental effects; Genetic and environmental variances; Additive, dominance, epistasis and cytoplasmic effects; Relationships and genetic diversity: Heterosis / Hybrid vigour, Heritability and G×E correlations; Genetic designs: basic generations, BIPs; Diallele.

## AGRICULTURAL CHEMISTRY

The Department of Agricultural Chemistry offers advance courses in the discipline of Food Chemistry, Food Technology, Human Nutrition, Value Addition of Foods, Soil Fertility and Environmental Soil Science. The Department has well equipped laboratories to conduct research and a pilot plant for commercialization of the research outputs. During this programme, the students are assigned to undergo intensive in-plant training in leading Industries and Research Institutes. The students are guided to carry out assignments where they can integrate knowledge in the identification, description, analysis and solution to the problem within the area of specialization.

Course Code	Course Title	Credit Units
<b>6<sup>th</sup> Semester</b>		
AC 3201	Natural Resources and Soil Fertility	(2: 15/30/55)
AC 3202	Advanced Soil Science	(2: 20/10/70)
AC 3203	Applied Soil-Plant - Microbe Interaction	(2: 15/30/55)
AC 3204	Introduction to Soil Biochemistry	(2: 15/30/55)
AC 3205	Principles of Instrumental Analysis and Techniques in Soil Research	(2: 15/30/55)
AC 3206	Soil Fertility Evaluation and Fertilizers	(2: 30/00/70)
AC 3207	Food Chemistry	(2: 15/30/55)
AC 3208	Food Microbiology	(2: 15/30/55)
AC 3209	Food Analysis	(2: 15/30/55)
AC 3210	Postharvest Technology of Agricultural Commodities	(1: 15/00/35)
AC 3211	Processing Technology of Crop Commodities	(2: 15/30/55)
AC 3212	Dietetics	(2: 15/30/55)
<b>7<sup>th</sup> Semester</b>		
AC 4101	Soil Conservation and Environmental Quality	(2: 15/30/55)
AC 4102	Land Evaluation and Land Use Planning	(2: 30/00/70)
AC 4103	Biology of Soil Ecosystem	(2: 15/30/55)
AC 4104	Problematic Soil Management	(2: 20/10/70)
AC 4105	Soil and Nutrient Management for Sustainability in Agro Ecosystems	(2: 30/00/70)
AC 4106	Soil Pollution and Control Strategies	(2: 30/00/70)
AC 4107	Soil Quality and Health	(2: 30/00/70)
AC 4108	Food Safety and Quality Control	(2: 30/00/70)
AC 4109	Food Process Engineering	(1: 15/00/35)
AC 4110	Bioprocessing Technology	(1: 15/00/35)
AC 4111	Processing Technology of Animal Commodities	(2: 15/30/55)
AC 4112	Community Nutrition	(2: 20/20/60)

### **AC 3201 Natural Resources and Soil Fertility (2: 15/30/55)**

Evaluating soil health: the key aspects of soil biology, chemistry and physics that influence growth of horticultural and agricultural crops and pastures. Interactions between soil biological, chemical and physical factors, and best management practice of soils for sustainable production.

### **AC 3202 Advanced Soil Science (2: 20/10/70)**

Solute transport, transport and degradation of dissolved and particle-bound substances in soil water, Wetting and non-wetting properties of soils, Surface free energy of soils, adhesion vs. cohesion, tillage and soil structure management, Soil compaction, Importance of Soil water management, Water shortages & conservation, Monitoring and maintaining Soil Moisture. Colloidal chemistry of soil constituents, Adsorption, desorption, Double layer theory, zeta potential, balance of repulsion and attraction ph buffering and buffer systems. The complex interplay among organic and inorganic solids, air, water, microorganisms, and plant roots in soil.

### **AC 3203 Applied-Soil-Plant Microbe Interaction (2: 15/30/55)**

Soil organic matter: plant residue decomposition and nutrient release, mineralization and immobilization of nutrients Microbial ecology, microbes in nutrient cycles important to agriculture, plant microbe interactions in the rhizosphere, bacterial fertilizers, composting, waste disposal,

### **AC 3204 Introduction to Soil Biochemistry (2: 15/30/55)**

Soil Biochemistry: Its Definition and Scope, Soil Enzymes and Enzyme Kinetics, the Microbial Biomass and Biochemistry, Biochemistry of Carbon Transformations in Soil, Biochemistry of Nitrogen Transformations in Soil, Biochemistry of Phosphorus and Sulfur Transformations in Soil, Biochemistry of Metal Transformations in Soil, Biochemistry of Xenobiotics in Soil, Biochemistry of Biologically Active Materials in Soil

### **AC 3205 Principles of Instrumental Analysis and Techniques in Soil Research (2: 15/30/55)**

Instrumental methods of chemical analysis: The main basics, Advantages, Classification. Potentiometry, Electrophoresis, Conductometry, Colorimetry, Spectroscopy, Flame photometry, Atomic Absorption spectrophotometry, Chromatography, Nuclear chemistry, Radioactivity. Safety measures in laboratories. Basic principles of analytical methods, analytical procedures to obtain data, methods of chemical separation, measurements. Modern analytical methods used for soil quality testing, soil testing for plant available nutrients, determination of environmental pollutants and the specific methods for the water analysis.

### **AC 3206 Soil Fertility Evaluation and Fertilizers (2: 30/00/70)**

Soil testing, Modern approaches in soil fertility evaluation and fertilizers and classification, principles of fertilizer application, methods of fertilizer application. Integrated plant nutrient management: objectives, Components and importance. Soil testing and fertilizer recommendations and management.

### **AC 3207 Food Chemistry (2: 15/30/55)**

Introduction to Food Chemistry, Societal role of food chemists, Properties of water and ice, Water activity, Moisture sorption isotherms, Monosaccharides and monosaccharide reactions, Non-enzymatic browning, Polysaccharides and polysaccharide reactions, Gelatinization of starch, Nomenclature, Physical aspects and chemical aspects of lipids, Lipolysis, auto-oxidation and thermal decomposition of lipids, proteins, Pigments, Food flavours, Food Enzymes, Food additives. Effect of processing, cooking and storage environment on food components.

### **AC 3208 Food Microbiology (2: 15/30/55)**

Food as a substrate for micro-organisms, factors influencing the growth of microbes in food. Microorganisms important in food microbiology, Molds: classification, Yeasts and yeast like fungi, Bacteria, industrial importance mold, yeast and bacteria, principles of food spoilage, causes of spoilage, Food Fermentations: Bread, Traditional fermented foods, Malt beverages, wines, distilled liquors, vinegar, fermented vegetables, fermented dairy products, Oriental fermented foods. Contamination of foods, from green plants and fruits, from animals, from sewage, from soil, from water, from air, during handling and processing, Foodborne illness: Infections and intoxicants, Myco-toxins, Food borne parasites, Seafood Toxicants,

### **AC 3209 Food Analysis (2: 15/30/55)**

Introduction of food analysis, food sampling and sample preparation, evaluation of analytical data, pH and titratable acidity, determine acid content of food and beverages, Basic principles of Spectroscopy, Introduction of UV Spectroscopy, Determine Food Protein Concentration with UV Spectroscopy, UV Spectroscopy and Instrumentation, Fluorescence Spectroscopy, concept and potential of for food applications. Infra-red, Determine chemical composition of the food samples, Electrophoresis, chromatography, Rheological principles for Food Analysis, Determine Viscosities of carbohydrate solutions.

### **AC 3210 Postharvest Technology of Agricultural Commodities (1: 15/00/35)**

Postharvest logistics for perishable crops, Marketing management for postharvest operations. Postharvest losses of fruits & vegetables, Post-harvest Technology of Cut Flowers- Vase life vs Shelf Life, Extending the vase life of Cut Flowers and Packaging. Postharvest Technology of Animal Produce: Postmortem changes and Rigor Mortis. Icing of Fish, Slaughtering of Animals, Meat Tenderization and Freezing and Packaging. Pre-harvest and post-harvest problems in Cereals, Legumes, Pulses, Nuts and Spices. Drying, Storage and Packaging of Unperishables.

### **AC 3211 Processing Technology of Crop Commodities (2: 15/30/55)**

Processing of Wheat, Rice, Maize, Barley and Millets. Application of canning, dehydration and freezing technologies in Fruits and Vegetables processing, Processing of ready-to-use products from fruits and vegetables, Theories for preparation of fruit preserves, Fruits and Vegetables products for exports. Processing of Nuts, Legumes and Spices. Beverage Technology.

### **AC 3212 Dietetics (2: 15/30/55)**

Meal Planning Recommended Daily Allowance (RDA), Nutritional Needs of Various Age Groups. Diet Therapy. Opportunities and limitations for Dieticians in Sri Lanka. Role, Functions and conduct of Dieticians. Dietetics in relation to the needs of different socio economic groups. Nutrition and Dietetics outreach.

### **AC 4101 Soil Conservation and Environmental Quality (2: 15/30/55)**

Soil and the environment, Understand the principles of soil erosion processes and management, Erosion and sediment control, practices to decrease erosion , Soils as source of greenhouse gases, Nitrous Oxide Emissions, Ozone depletion, Carbon sequestration in soils, Soil management for carbon sequestration, Characterization of SOM, pools of SOM, Erosion, sediment, and soil conservation, deforestation, saline and Sodic Soils Causes and Remediation

### **AC 4102 Land Evaluation and Land Use Planning (2: 30/00/70)**

Nature and principles of land evaluation, Land utilization and land use types, Land suitability and capability, Land suitability classification, Soil parameters of agricultural significance, Standards of evaluating soil parameters, Methods and techniques of evaluating soils: drainability tests, infiltration, compaction, depth, Crop requirements from soils properties perspective, Crop selection for a land based on soil properties. Limitations and improvements of land qualities.

### **AC 4103 Biology of Soil Ecosystem (2: 15/30/55)**

The Soil Food Web , The Food & Web Soil Health , the importance of the soil food web, what do soil organisms do, food sources for soil organism, where do soil organisms live, bacteria, soil fungi, soil protozoa, nematodes, arthropods, earthworms, , interactions of earthworms with other members of the food web, predators, herbivores.

### **AC 4104 Problematic Soil Management (2: 20/10/70)**

Acid soils: courses, problems, and amelioration or management of soil acidity. Salt affected soils: classification and formation. Saline soils and their management: diagnosis, salinity problems, salinity classes and effect of salinity on crop growth. Alkali soils: Formation, characteristics, problems and reclamation or management of alkali soils. Field visits to identify problematic soils and to study management practices.

#### **AC 4105 Soil and Nutrient Management for Sustainability in Agro ecosystems (2: 30/00/70)**

Management of plant nutrients in agronomic systems; diagnosis of nutrient availability and prediction of crop response to fertilizers; interactions between nutrient response and chemical, physical and biological properties of soils. Avoiding environmental damage, practice of good soil management for Sustainable Agriculture and Environmental Protection. Submerged soil management. Soil constraints and environmental problems and their management on sustainably.

#### **AC 4106 Soil pollution and Control Strategies (2: 30/00/70)**

Soil contamination by chemical pollutants: sources and fate. Solid and Hazardous waste, Radioactive wastes. Phytoremediation Technologies (Phyto-extraction, Rhizofiltration, Phytostabilization, Rhizodegradation, Phyto-degradation, Phyto-volatilization, Hydraulic Control, Vegetative Cover Systems, Riparian Corridors/Buffer Strips)bioremediation by microorganisms; contamination by inorganic (including heavy metals) and organic pollutants; factors affecting uptake of contaminants, prevention and elimination of contamination; landfills.

#### **AC 4107 Soil Quality and Health (2: 15/30/55)**

Evaluation of soil quality factors or indicators. The impact of agricultural practices: cultivation and introduced soil chemicals on soil health. Measures to ameliorate the problems. Field visits to study the impact of farming on soil quality.

#### **AC 4108 Food Safety and Quality Control (2: 30/00/70)**

Food Standards and Quality Control -Food inspections, Quality control in food industry, Role of quality controllers, Quality assurance, GMP, HACCP, ISO and laboratory accreditation, Total quality management in food industries, Science based quality management practices. Sensory Evaluation of Foods ~ Role of sensory evaluation in food industry, Food Packaging- Transport, cleaning and storage of raw materials, Storage systems, Storage pests. Protection of food from pests.

#### **AC 4109 Food Process Engineering (1: 15/00/35)**

Physical characteristics of food materials, Mass and energy balance, Rheology of foods; Viscoelastic behaviour and rheometers, Laminar and turbulent flow, Heat transfer, Food dehydration and drying, Psychrometrics, Equilibrium moisture content, Estimation of drying rates and time for dryer types, Properties of frozen foods, ice-crystal formation and freezing point dispersion, Cooling determination, Aero and hydrodynamic characteristics, Size reduction equipment/machines, Mechanical separation techniques,. Development of inocula, kinetics of enzymatic and microbial processes, optimisation studies, general principles of bioreactor design and their operation. Upstream Processing and Downstream Processing. Construction of Flow charts, Cost estimation & workforce.

#### **AC 4110 Bioprocessing Technology (1: 15/00/35)**

Raw materials for bioprocessing, comparison of chemical and biochemical processing based on energetics and environmental issues. Production of antibiotics, vitamins. Classification of and biochemistry of antibiotics, Microbial biomass, single cell proteins and its nutritional values. Immobilization of cells and enzymes : principles, methodology and applications, disintegration of cells, separation of solid and liquid phases, isolation and purification techniques for proteins and other products based on different physico-chemical properties. Bioprocess automation and application of computers in bioprocessing, recombinant products with representative examples.

#### **AC 4111 Processing Technology of Animal Commodities (2: 15/30/55)**

Dairy chemistry, Testing and quality control in milk products, , Processing of fluid milk, Formulation of milk products, Processing and preservation of fish and fish products, Spoilage of fish products, Post harvest handling of Fish, Preservation of Fish, Products from krill, Food regulations relating to fish products, Utilization of seaweeds. Processing and preservation of meat and meat products, Quality and factors determining quality of poultry meat, Processing of egg products, Brief overview of Mutton, Pork and Beef Industry.

#### **AC 4112 Community Nutrition (2: 20/20/60)**

Global and Sri Lankan Nutrition Situation .Primary Healthcare, Health Information System in Sri Lanka, safe motherhood, nutritional well being, healthy living, clinical and public health, food habits, social and cultural influences on food choice. Nutritional Survey, Assessment of the nutritional status of community and interpretation of nutritional status data. Types of nutrition interventions and programs existent in Sri Lanka. Dietary recommendations and policies in Sri Lanka (Vitamin A, Iodine, Iron, HIV/AIDS, Infant feeding). Nutrition in complex emergency situations (During war and famine). Nutrition Education, Nutrition Surveillance, food security, food insecurity and vulnerability information and mapping system.

## AGRICULTURAL ECONOMICS

The advanced programme in Agricultural Economics is designed to allow students to acquaint themselves in key areas of Agricultural Economics, Extension and Business Management. The courses are designed to equip the students with knowledge and skills necessary to conceptualize and implement socio-economic development as well as business and management related strategies in agriculture. The students are exposed to a number of inter-disciplinary courses to impart skills on human behaviour attributes such as leadership, teamwork and effective communication skills whilst covering broad dimensions in Social Science. Giving due recognition to the dynamics of the modern world, the graduate is armed with competencies in management, marketing and entrepreneurship too.

Course Code	Course Title	Credit Units
<b>6<sup>th</sup> Semester</b>		
EC 3201	Agricultural Finance	(2: 30/00/70)
EC 3202	Agricultural Price Analysis	(2: 30/00/70)
EC 3203	Environmental Economics	(2: 30/00/70)
EC 3204	Gender and Development	(2: 30/00/70)
EC 3205	Land Economics	(2: 30/00/70)
EC 3206	Livestock Economics and Marketing	(2: 30/00/70)
EC 3207	Mathematical Economics	(2: 30/00/70)
EC 3208	Production Economics	(2: 30/00/70)
EC 3209	Natural Resource Economics	(2: 30/00/70)
<b>7<sup>th</sup> Semester</b>		
EC 4101	Social Research Methodology	(2: 30/00/70)
EC 4102	Fisheries and Aquaculture Economics	(2: 30/00/70)
EC 4103	Agricultural Marketing	(2: 30/00/70)
EC 4104	Basic Econometrics	(2: 30/00/70)
EC 4105	Environmental Valuation	(2: 30/00/70)
EC 4106	Information Systems for Agricultural Development	(2: 30/00/70)
EC 4107	International Trade	(2: 30/00/70)
EC 4108	Project Planning and Investment Analysis	(2: 15/30/55)
EC 4109	International Economics	(2: 30/00/70)

### **EC 3201 Agricultural Finance (2: 30/00/70)**

Introduction to Agricultural Finance, A Look at Current Farm Financial Conditions, An Introduction to Competitive Strategy and the Structure of Agricultural Credit Markets, Financial Analysis, Planning and Control Farm Businesses, Capital Structure, Liquidity and Risk Management, Agribusiness Finance, Capital Budgeting and Long-Term Decision Making, Risk Management.

### **EC 3202 Agricultural Price Analysis (2: 30/00/70)**

Consumer Demand Theory and Theory of the Firm, Product and Input Demand Curves, The Role of Prices in a Free Market Economy, Aggregate Demand and Supply Curves, Changes in Quantity Demanded (Supplied) vs Changes in Demand (Supply). Elasticities of Demand and Supply, Relations between elasticities, Marketing Margins and Farm-Retail Price Spreads, Relation Between Farm-Retail Price Elasticities, Long run vs Short run Elasticities. Understanding agricultural prices and markets, Empirical agricultural price analysis, International Agricultural Trade, Market structure and Price determination Models. Empirical Models of Demand and Supply, Agribusiness Marketing Strategies, Managing Price through Futures Markets; Strategic Price Setting.

### **EC 3203 Environmental Economics (2: 30/00/70)**

Introduction to Resource and Environmental Economics: Historical background, resource scarcity, Market and social welfare-welfare economic principles, market failure, externalities. Property right, common property and public goods, Economics of Climate change, Principles of Environment Impact Assessment, Economics of Pollution, Pigouvian taxes, Coase theorem.

### **EC 3204 Gender and Development (2: 30/00/70)**

Introduction and overview – Introduction to gender concepts, importance of gender perspective in development initiatives, gender difference across the developing world, Approaches to gender and development – Welfare approach, Women in Development (WID) approach, Gender and development (GAD) approach, Empowerment approach, Power relation and gender inequalities in developing countries.

### **EC 3205 Land Economics (2: 30/00/70)**

Principle of Land Utilization, Objectives of rational land use, Elements of land use planning, Political economy of land. Soil surveys and land classification methods, Relationship between land use classification and economic utilization of land, Farm management techniques for the optimization of land use. Interrelationship and conflicts between optimum micro land utilization principles and macro land use objectives, Principles of conservation; forestry, land reclamation and Soil conservation as land policies, Land settlement policies; Economic and social evaluation of land settlement policies and multi-purpose project Land reform principles and policies, Land policies of Sri Lanka since the 1920's.

### **EC 3206 Livestock Economics and Marketing (2: 30/00/70)**

Introduction to livestock economics, Theory of factor-product, factor-factor, product-product, Theory of demand, theory of markets, Government policies in livestock industry, Vertical horizontal interaction in livestock industry, Farm records, Farm planning and budgeting, Linear programming with examples in livestock industry. Cost-benefit analysis of egg production, marketing of eggs, broilers, meat and meat products, milk and milk products, fish and fish products.

### **EC 3207 Mathematical Economics (2: 30/00/70)**

Differential calculus; applications in graphing, maxima and minima, production, cost, revenue and profit functions. Exponents and logarithms; present values, annuities. Linear algebra; first order and second order conditions. Constrained and unconstrained optimization. Homogeneous and homothetic functions. Economic applications of optimization.

### **EC 3208 Production Economics (2: 30/00/70)**

The production function and its usefulness in management, The factor-factor and product-product situations, Influence of time on production, Estimation and interpretation of production functions and possible applications of production function, Linear programming and sensitivity analysis.

### **EC 3209 Natural Resource Economics (2: 30/00/70)**

Introduction: Classification of resources- Renewable, non-renewable, Resource taxonomy, Storable Renewable resources: Forests, The economics of forest harvesting. Renewable common property resources: fisheries and other species, static efficient sustainable yield, dynamic efficient sustainable yield, Appropriability and market solutions. Depletable, Non-recyclable energy resources: Natural- price control. Replenishable but depletable resources: Water, efficient allocation of scarce water – surface water and groundwater. Property Rights, Externalities.

### **EC 4101 Social Research Methodology (2: 30/00/70)**

Introduction: Scientific research methods, Stages in the research process, Hypothesis formulation; Population: Distribution – Normal, Sample, Sample size, Significant testing; Sampling Theory: Sample, Sampling, Sampling units; Sampling design – probability and non-probability sampling, Sampling frame; Methods and data collection: Questionnaire, Observations, Rapid Rural Appraisal (RRA); Farm Surveys: Goals / Objectives, Survey Methods, Organizing a survey, Budget; Supervision / Training, Coding data & Data entry; Analysis and Interpretation, Ethics of research

### **EC 4102 Fisheries and Aquaculture Economics (2: 30/00/70)**

Review of production function, Demand and supply of fish, Marketing, Bio-economic model, estimate economic efficiency for aquaculture production,

environmental regulation in aquaculture, Regulation in fishery: input control, output control

#### **EC 4103 Agricultural Marketing (2: 30/00/70)**

Definition for marketing, Micro and Macro approaches to agricultural marketing, Economic integration, market environment, types and functions of marketing/markets, marketing costs and margin, Marketing and its role in development, Marketing mix, elements and their importance, consumerism and legislation in marketing, local institutions in marketing, farmer organizations, marketing orders and arrangements, cooperative marketing, marketing of agricultural products and problems in Sri Lanka.

#### **EC 4104 Basic Econometrics (2: 30/00/70)**

Introduction of quantitative methods and their role in economics. Simple regression analysis. Multiple regression analysis. Role of assumptions and consequences of violation of assumptions. Dummy variables use, computer analysis, interpretation.

#### **EC 4105 Environmental Valuation (2: 30/00/70)**

Economic values: Types of values. Valuation methods: classification. Revealed Preference methods: Hedonic property value, Hedonic wage method, Avoidance expenditure, Travel Cost Method. Stated, preference methods; contingent valuation, Willingness to pay, choice experiments, contingent ranking.

#### **EC 4106 Information Systems for Agricultural Development (2: 30/00/70)**

Introduction to Communication and Innovation Studies, Agricultural Information Systems: Introduction, conceptual aspects, the information System and the mix, Indigenous Technical Knowledge (ITK), Agricultural Information Systems in Industrial Countries, Agricultural Knowledge Information Systems (AKIS) for Rural Development, Agricultural Information Systems and Communication Networks, Agricultural Knowledge Support Systems, ICT in Agricultural Extension.

#### **EC 4107 International Trade (2: 30/00/70)**

Theory of international trade, Barriers of trades, effect of trades on income distribution and welfare, Trade and Sri Lankan economy, directions of trade, trading partners, balance of payment equilibrium, capital movements, Exchange rates, Institutions of international trade, Terms of trade between developed and developing countries, Role of international agencies, country evaluation and selection, collaborative arrangements and control strategies.

### **EC 4108 Project Planning and Investment Analysis (2: 15/30/55)**

Defining the Project: Defining the project scope, the project cycle, Establishing project priorities, Creating the Work Breakdown Structure, Project Organization and information system, Developing a project plan, Project planning and implementation, Estimating project time, Costs and benefits: Guidelines for estimating time, Costs and Resources, Developing Budgets, Network Analysis for project implementation, Estimating project time, Costs and Benefits: guidelines for estimating time, Costs and Resources, Developing Budgets, Network Analysis for project implementation, Scheduling of Resources-Human and Financial: PERT Chart, GANTT Chart, Impacts of Project-Community and Environment, Measures of project worth, Sensitivity Analysis-at different scenarios, Computers in project planning and management: Practical exercises on using the EXCEL and MS PROJECT Software will be conducted.

### **EC 4109 International Economics (2: 30/00/70)**

Introduction: International Economics and Economic Theory, The Mercantilist View on Trade, Adam Smith: Absolute Advantage, David Ricardo: Comparative advantage, Evaluation of Ricardo's Law of Comparative Advantage, Pure theory of international trade, Comparative Advantage and Opportunity Costs, The Production Possibilities Curve: Constant Costs, The Basis for Trade and the Gains from Trade under Constant Costs, Increasing Costs, The Basis for Trade and the Gains from Trade under Increasing Costs. International Trade Theory-demand and Supply: Offer Curves and Equilibrium Relative Commodity Price with trade, The terms of trade of a nation, Instruments of Trade Policy: Basic Tariff Analysis, Costs and Benefits of a tariff, Export subsidies.



## AGRICULTURAL ENGINEERING

The advanced programme in the Department of Agricultural Engineering has been meticulously designed to provide the students with an in-depth knowledge on diverse Engineering applications in Agriculture, Environment and Postharvest Technology to cater the existing demand and to meet the challenges in the field. The courses encompass a global view of the food production systems, the wise management of natural resources in the production, processing, storage and use of food fiber and other biological products. Upon completion of the advanced programme, the students will be able to analyze industrial problems based on agriculture, postharvest processing, eco-system protection, renewable energy development and other biological systems related to engineering aspects and find valuable solutions based on engineering principles.

Course Code	Course Title	Credit Units
<b>6<sup>th</sup> Semester</b>		
AE 3201	Climate change and Water Resource Management	(2: 15/30/55)
AE 3202	Soil and Water Conservation Engineering	(2: 15/30/55)
AE 3203	Environmental Pollution and Control	(2: 15/30/55)
AE 3204	Green Technology for Agriculture	(2: 15/30/55)
AE 3205	Postharvest Engineering	(2: 15/30/55)
AE 3206	Testing and Evaluation of Farm Machinery	(2: 15/30/55)
AE 3207	River Basin Management	(2: 15/30/55)
AE 3208	Engineering Hydraulics	(2: 15/30/55)
AE 3209	Elementary Farm Surveying	(2: 15/30/55)
AE 3210	Fundamentals of Remote Sensing	(2: 15/30/55)
AE 3211	Structural Design of Farm Structures	(2: 15/30/55)
AE 3212	Electronics II for Agriculture	(2: 15/30/55)
<b>7<sup>th</sup> Semester</b>		
AE 4101	Advanced Watershed Management	(2: 15/30/55)
AE 4102	Pressurized Irrigation System	(2: 15/30/55)
AE 4103	Water Quality for Agriculture	(2: 15/30/55)
AE 4104	Environmental Impact Assessment	(2: 15/30/55)
AE 4105	Waste Management	(2: 15/30/55)
AE 4106	Advanced Farm Mechanization	(2: 15/30/55)
AE 4107	Postharvest and Process Engineering	(2: 15/30/55)
AE 4108	Advanced Hydrology and Meteorology	(2: 15/30/55)
AE 4109	Hydrogeology	(2: 15/30/55)
AE 4110	Advanced Geo Spatial Techniques	(2: 15/30/55)
AE 4111	Disaster Management & Mapping	(2: 15/30/55)
AE 4112	Sensors & Transducers and Data Acquisition Systems for Precision Agriculture	(2: 15/30/55)

### **AE 3201 Climate change and Water Resources Management (2: 15/30/55)**

Climate and Weather, Climate change: evidences, temperature variation, rainfall, humidity and evaporation. Climate change impact on water resources, agriculture, environment, livestock production, climate change adaptation and mitigation, Floods and water logging causes, Flood control measures, Classification of floods, introduction to flood estimation and design of flood frequency. Socio economic conditions and climate change. Farmer's awareness on climate change. Adaptation strategies. Importance of water resources management in Sri Lanka, major components and functions of water resources management. Water Resources of Sri Lanka, Water resources in Batticaloa, water use in agriculture, problems and extent of irrigated and rainfed land, potential of surface and ground water availabilities. Management and utilization of ground water. Water Users' Associations: need of water users' associations in Sri Lanka. Problems and constraints in establishment of water users' association.

### **AE 3202 Soil and Water Conservation Engineering (2: 15/30/55)**

Introduction: importance and scope of soil and water conservation. Soil erosion: types, water and wind erosion, mechanics of erosion. Factors affecting water and wind erosion. Precipitation: rainfall characteristics related to erosion. Watershed: definition, watershed characteristics. Factors affecting infiltration and runoff, importance of infiltration in soil and water conservation. Soil loss equation and its components, soil loss estimation, Erosion and Control Practices, Vegetated Waterways, Terracing. Conservation Structures, Farm Ponds, water harvesting concepts, site selection and design of farm ponds. Agronomic practices to control erosion: tillage, contour farming, strip cropping, and cover crops. Field visit to soil and water conservation sites.

### **AE 3203 Environmental Pollution and Control (2: 15/30/55)**

Environmental pollution, types of environmental pollution, impacts of air, water and soil pollution on environment, health and agriculture, air pollution and control: nature, sources, types of pollutants, atmospheric diffusion of pollutants and air pollution controlling strategies, water pollution and control: nature, sources, types of pollutants and water pollution controlling strategies, soil pollution and control: soil contamination by chemical pollutants (organic and inorganic): sources and fate, remediation by plants, bioremediation by microorganisms and soil pollution controlling strategies, noise pollution and control: nature, sources and noise pollution controlling strategies, thermal pollution and control: nature, sources and thermal pollution controlling strategies

### **AE 3204 Green Technology for Agriculture (2: 15/30/55)**

Introduction to green technology, application of green technology in agriculture, green technology and environmental concerns, technologies for environment-friendly agriculture: Energy basis (renewable energy): solar energy, wind energy, biomass energy, hydropower energy, geo-thermal energy, tidal/wave energy, etc. Environmental basis: impacts of pollution on agriculture, technologies to

reduce/eliminate pollution, agricultural waste management - properties of agricultural wastes, effect of agricultural wastes on natural resources, methods of agricultural waste management (composting technology, biogas technology, etc.)

#### **AE 3205 Postharvest Engineering (2: 15/30/55)**

Status of postharvest sector of grains in Sri Lanka, harvesting, threshing and post-harvest losses of grains, Principles of post-production practices of rice – Harvesting, Threshing, Drying, Theory of drying, Psychrometrics of air and its applications on agro processing, Drying techniques and types of dryers, Storage methods , Parboiling, Milling techniques, Quality control, Postharvest engineering and Processing of fruits and vegetables, Overview of engineering principles of preservation, Design of on farm cold stores - Calculation of field heat load, respiration load, conductive heat gain load through walls, ceilings and floor, convective heat gain due to mixing of air, equipment heat load, human energy load, Refrigeration of fish , meat and poultry, Refrigeration load of cold storage rooms, Transportation of refrigerated food.

#### **AE 3206 Testing and Evaluation of Farm Machinery (2: 15/30/55)**

Types of tests; test procedures, test equipment; usage and limitations, laboratory and field testing of selected farm equipment, tractor performance testing, evaluation and interpretation of results, review and interpretation of test reports, training on operation and maintenance of farm machinery at Farm Mechanization Training Centre, Anuradhapura.

#### **AE 3207 River Basin Management (2: 30/00/70)**

Integrated Water Resources Management (IWRM) and its concepts, water policy, water sharing, sectoral demand and resource allocation. Water concepts such as water scarcity, virtual water, Assessment of water requirements of agriculture, domestic, industry and environmental sectors, Supply and demand management, Water quality characteristics and management, Wetland: definitions and classification of wetlands, wetland hydrology and wetland ecosystem, wetland management, wetland laws and protection. Riparian ecosystem, Stream channel morphology and stream classification, Dam construction and its impact on ecosystems, Watershed modelling.

#### **AE 3208 Engineering Hydraulics (2: 15/30/55)**

Properties of fluid: density, viscosity, surface tension, bulk modulus of elasticity, compressibility of fluids, Laws of conservation of mass, momentum and energy, Fluid statics: pressure variation in a fluid, pressure measuring devices, gauges and manometers, buoyancy and stability of submerged and floating bodies, pressure on immersed surfaces and masonry dams, depth of centre of pressure on immersed surfaces. Fluid kinematics: types of flow, continuity equation, Bernoulli's equation and its application. Energy consideration in steady flow: general equations of steady flow, steady flow in pipes, heads, hydraulic and energy gradient lines, power consideration, losses of head. Fluid measurements:

orifice, weir and notches, venturimeter, derivation of discharge formulae and their application. Open channel flow, Dimensional analysis.

#### **AE 3209 Elementary Farm Surveying (2: 15/30/55)**

Introduction to Surveying. Historical development of survey in Sri Lanka. Principles of survey. Survey Equipment. Surveying methods: Chain, Plane table, Levelling, Contour, Theodolite, Global Positioning System (GPS), Aerial survey.

#### **AE 3210 Fundamentals of Remote Sensing (2: 15/30/55)**

Introduction to remote sensing. Principles of electromagnetic energy. Introduction to satellites and sensors. Visual interpretation. Digital image processing, enhancement, classification and accuracy assessment. Software applications for image processing. Case studies and applications in agriculture and related disciplines.

#### **AE 3211 Structural Design of Farm Structures (2: 15/30/55)**

Selection of building materials for farm buildings. Elements of farm buildings. Functional forces in building structures. Environmental conditions required for farm buildings. Housing for specific requirements: animal husbandry, crop and postharvest storages.

#### **AE 3212 Electronics II for Agriculture (2: 15/30/55)**

Circuit Theory Fundamentals, FET Amplifiers, Multiplexes, MOSFET logic switches, MOSFET Power Switching; Operational Amplifiers and their applications; The 741 op-amp, The use of op-amps to perform mathematical operations, Feedback amplifiers, Digital Electronics: Binary numbers, Truth Table, Logic gates, Boolean algebra and De Morgan's Theorem, Flip-flop and sequential circuits. Filters, Oscillators and Multivibrators, Optoelectronics, CMOS Logic Gates, NAND and NOR circuits, Logarithmic amplifier, Schmitt Trigger, Instrument amplifiers and power supplies, AC to DC converters, IC regulators, DC to DC converters, Batteries, solar cells, super capacitors, Oscillators, Wien bridge, LC, IC and crystal oscillators, Oscillators, Timer chip 555.

#### **AE 4101 Advanced Watershed Management (2: 15/30/55)**

Concepts and definitions of watershed management, current problems in watersheds. Importance of watershed management. Watershed: Definition, Small and large watersheds, Watershed characteristics, Deterioration of watershed, Watershed Delineation, Coding of watershed.

Principles of watershed management, Objectives of watershed management, Factors affecting watershed management, Benefits of watershed management, Steps of watershed management, Watershed development methods, Watershed management practices, Sedimentation of resources, Controlling sedimentation of reservoirs, Watershed work plans, Integrated watershed management, Water harvesting, Conflict Management in watershed area. Agronomic, engineering

practices for soil and water conservation in water shed area, natural resource management, Water Harvesting. Field study trips to watershed areas, small dam sites and other watershed project sites and writing reports

#### **AE 4102 Pressurized Irrigation System (2: 15/30/55)**

Introduction to pressurized irrigation system, types of pressurized irrigation system, micro irrigation, advantages and limitations, system components: control head, pipe distribution network. Layouts of the system, design requirements, estimation of water requirement. Drip irrigation: design procedure, selection of emitters, design of lateral, manifold, sub main, main and pump. Head loss through emitter, lateral. Drip design problem, fertigation, clogging of emitters. Care and maintenance of the system. Sprinkler irrigation: advantages and disadvantages, system components, layouts, types of sprinkler system, uniformity coefficient, design procedure, selection of nozzles, design problems, evaluation. Visit to a sprinkle and trickle irrigation project sites

#### **AE 4103 Water Quality for Agriculture (2: 15/30/55)**

General information on water quality, quality of irrigation water: problems of poor water quality, managing water quality, water quality criteria, suitability and classification of irrigation water, use of saline water for crop production, wastewater irrigation in crop production. Analysis of irrigation water. Irrigation water quality effects on soil environment. Measurement of infiltration rate of saline, sodic and waterlogged soils. Quality of drainage water, Agricultural chemicals and Groundwater Contamination.

#### **AE 4104 Environmental Impact Assessment (2: 15/30/55)**

Introduction, history of EIA in Sri Lanka, legal framework governing EIA in Sri Lanka, resources needed for an EIA, role of environmental agencies in the application of EIA process, prescribed projects, project approving agencies, steps and process involved in IEE and EIA in Sri Lanka: preliminary information, screening, scoping, Terms of Reference (ToR), EIA study and report preparation, EIA report review, decision making and implementing, monitoring, implementation issues and case studies.

#### **AE 4105 Waste Management (2: 15/30/55)**

Waste types, solid waste generation and quantities, sampling and characterization of Municipal solid waste, impact of accumulated solid waste on environment and health, waste management concept (Reduce, Reuse, Recycle), Municipal solid waste management: storage, collection, handling and transport, processing/treatment and disposal of solid waste, basic design considerations, integrated solid waste management system, wastewater, sources, characteristics of wastewater (physical, chemical, biological, etc), wastewater sampling and analysis, problems of wastewater to environment and health, wastewater treatment processes (physical, chemical, biological, etc) and basic design considerations.

#### **AE 4106 Advanced Farm Mechanization (2: 15/30/55)**

Present status of Farm Mechanization in Sri Lanka, Analysis of agricultural machine components and systems, Measuring field performance of agricultural machinery, hydraulic power transmission, selection of optimum power requirement, costing of farm machinery, human factors and safety of farm machinery on operation.

#### **AE 4107 Postharvest and Process Engineering (2: 15/30/55)**

Engineering Properties of food materials: Physical, mechanical, thermal, rheological, electrical and physico-chemical properties of various food materials, Diffusive transfer of heat and mass, conductive heat transfer, chilling and freezing, Flow of food materials: viscous flow, turbulent flow, multi-phase flow, working principles of food processing equipment for extrusion, mixing, distillation, extraction, concentration, solid-liquid separation etc., cold storage systems., Engineering fundamentals during cooling, cleaner production systems, Mathematical principles and application in food processing, Material and Energy balances, Heat transfer, Thermal process calculation.

#### **AE 4108 Advanced Hydrology and Meteorology (2: 15/30/55)**

Identification, quantification and analysis of hydrological processes: measurement, accuracy and hydrological data evaluation, measurement and analysis of rainfall, intensity-duration-frequency analysis, area-depth-duration analysis and stream flow measurement and analysis. Hydrograph analysis and synthesis: hydrograph concepts, hydrograph components, factors affecting the hydrograph shapes, determination of total runoff, unit hydrograph, derivation of unit hydrograph. Hydrological method of flood routing, Hydrological modelling: data requirement and limitations for hydrological modelling, simulation of component of process of hydrological cycle.

Water cycle and how water in all three phases exists and moves within the surface-subsurface-atmospheric continuum, Formation and classifications of clouds, Formation of disturbances, depression, cyclones, Air lifting mechanisms, Rainfall governing mechanisms of Sri Lanka, Global-scale winds, Atmosphere-Ocean interaction, Global weather events and their impacts on rainfall of Sri Lanka, Climate change, Spatial and temporal analysis of climate variables, Hydrological forecasting.

#### **AE 4109 Hydrogeology (2: 30/00/70)**

Introduction: basic concepts of groundwater and soil water, types of subsurface water, water potential, aquifer types. Formation of groundwater, aquifer functions, porosity, storage coefficient, hydraulic conductivity, transmissivity. Groundwater movement: Darcy's law and its application, observation wells, piezometers, flow nets, streamlines, equipotential lines, steady and non-steady flows. Well hydraulics: steady flow in confined and unconfined aquifers, steady flow in confined aquifer with uniform recharge, multiple well systems. Well construction: methods for constructing well, methods for drilling well, design of

wells and gravel packing, methods of groundwater exploration. Pumping and recharge/infiltration in relation to the geological environment, Contaminant transport, Groundwater quality and pollution.

#### **AE 4110 Advanced Geo Spatial Techniques (2: 15/30/55)**

Geo-informatics and Data quality. Basics of GIS operations and functions. Advanced GIS analysis and applications in ArcGIS. Overview of advanced RS applications and software applications. Field studies in combined applications of RS, GIS and GPS. Recent trends in Geospatial techniques.

#### **AE 4111 Disaster Management & Mapping (2: 15/30/55)**

Introduction to Hazards, Vulnerabilities and Disasters: Flood/Drought, Cyclone, Earthquake, Tsunami, Landslide. Introduction to Disaster Management. Planning for Disaster Management. Disaster Response and Post-Disaster Recovery. Hazard identification. GIS & RS applications and mapping for Disaster management.

#### **AE 4112 Sensors & Transducers and Data Acquisition Systems for Precision Agriculture. (2: 15/30/55)**

Types of sensors, transducers and their applications in agricultural industries, environmental monitoring and industrial safety. Data acquisition system; signal conversion techniques; A/D and D/A converters, Electronic Interfacing Devices, signal processing, signal transmission, impedance matching, pulse distortion and shaping, instrumentation for pulse signal processing, Instrumentation techniques, timing methods, coincidence techniques, triggers.



## ANIMAL SCIENCE

Currently, animal industries are challenged by issues related to the quality and safety of animal products, disease resistance, animal comfort and wellbeing, management efficiency, global markets and environmental stewardship. In considering these issues, the Department of Animal Science designed the advanced courses on farm animal production and processing techniques, and aquaculture. Upon successful completion of these advanced programmes, the graduates will be able to address the issues and problems related to livestock, poultry, and aquaculture sectors and effectively contribute to the development of related industries.

Course Code	Course Title	Credit Units
<b>6<sup>th</sup> Semester</b>		
AS 3201	Grassland Science	(2: 15/30/55)
AS 3202	Animal Biotechnology	(2: 15/30/55)
AS 3203	Fish Biology	(2: 15/30/55)
AS 3204	Animal and Slaughterhouse Waste Management	(2: 15/30/55)
AS 3205	Livestock Breeding	(2: 30/00/70)
AS 3206	Climatology and Animal Production	(2: 15/30/55)
AS 3207	Animal Disease, Hygiene and Public Health	(2: 15/30/55)
AS 3208	Feed and Feeding Practices in Aquaculture	(2: 15/30/55)
AS 3209	Micro-Livestock Production	(2: 15/30/55)
AS 3210	Animal Behaviour and Welfare	(2: 15/30/55)
AS 3211	Integrated Livestock Farming Systems	(2: 15/30/55)
AS 3212	Animal Biodiversity and Conservation	(2: 15/30/55)
AS 3213	English for Animal Science - Level I**	(1: 00/30/20)
<b>7<sup>th</sup> Semester</b>		
AS 4101	Ruminant Nutrition	(2: 15/30/55)
AS 4102	Monogastric Nutrition	(2: 15/30/55)
AS 4103	Physiology of Cattle Reproduction and Lactation and Endocrinology	(2: 15/30/55)
AS 4104	Advanced Livestock Breeding	(2: 15/30/55)
AS 4105	Culture of Ornamental Fish and Aquatic Plants	(2: 15/30/55)
AS 4106	Meat and Dairy Technology	(2: 15/30/55)
AS 4107	Mineral Nutrition in Ruminants	(2: 15/30/55)
AS 4108	Shrimp Production Technology	(2: 15/30/55)
AS 4109	Egg and Fish Processing Technology	(2: 15/30/55)
AS 4110	Chicken Embryology and Hatchery Technology	(2: 15/30/55)
AS 4111	English for Animal Science - Level II**	(1: 00/30/20)

\*\*Audit Course

### **AS 3201 Grassland Science (2: 15/30/55)**

Role of forages in productive agriculture; Introduction to grasses and legume species; Forage production and practices; Forage evaluation; Forage-Animal relationships; Importance of trees and shrubs in animal feeding; Nutritional limits to animal production for tropical pasture.

### **AS 3202 Animal Biotechnology (2: 15/30/55)**

Introduction. Historical retrospection. The cornerstone in modern Biotechnology. Gene technology: Basic techniques. Isolation/handling of genetic material. In vivo and in vitro DNA amplification. Gene cloning and expression. Gene vectors, Gene libraries. Isolation/detection of nucleic acid sequences/targets. Genomic studies. Genome Mapping (genetic, physical and transcript maps), RNA molecules, Gene polymorphisms. Transgenesis, Basic Bioinformatics. In vitro culture of animal cells and tissues. Cell lines, Hybridomas, Production of monoclonal - polyclonal antibodies and their use in immune fluorescence, ELISA and RIA. Production and use of stem cells.

Artificial insemination. Sperm and oocyte manipulation. In vitro fertilization. Sperm, oocyte and embryo cryopreservation. Recipient hormonal manipulation. Embryo transfer. Transgenic animals. Cloning. Biotechnological applications in animal nutrition targeting higher utilization of low nutritive value feedstuffs, the improvement of nutrient digestibility, the beneficial for the animal modulation of the gut ecosystem and the protection of the environment. Genetically modified feed, properties, legislation and analytical techniques of detection.

### **AS 3203 Fish Biology (2: 15/30/55)**

Basic structural features of fishes: basic morphology of finfish and shellfish, classification of finfish and shellfish; Fishes and their habitats: marine habitats, freshwater habitats; Growth in finfish and shellfish; Digestive system of fish: teeth, digestive tract, digestive enzymes, carnivorous fish, herbivorous fish, detritivores, plankton filters; Excretion and Osmoregulation of fish; Reproductive system of fish: hormones and reproductive behavior of fish, sex differentiation; Circulatory system; Respiratory system; Sensory system: lateral line, inner ear, sound reception and production, vision, electroreceptors and electric organs.

### **AS 3204 Animal and Slaughter house Waste Management (2: 15/30/55)**

Introduction; constraints of wastes; animal and slaughterhouse wastes; types of wastes; waste storage; composition of different wastes; toxic gases from the wastes; animal waste management methods: aerobic and anaerobic treatments, alkaline hydrolysis, land disposal of wastes, biogas production, composting, by-product development; fish waste management, processing of slaughter house wastes.

### **AS 3205 Livestock Breeding (2: 30/00/70)**

Animal breeding and its importance; Improvement of livestock production; Genes and inheritance; Concepts of quantitative genetics; Genetic basis of variation:

Phenotypic variation in economic traits, genotypic variation, environmental variation; Heritability and repeatability; Concept of breeding value; Principles of selection: selection differential, response to selection; Selection aids: progeny test, pedigree information, family information; Genetic diversity and inbreeding: forces that influence genetic diversity, change in diversity (inbreeding), causes of inbreeding, inevitable inbreeding, inbreeding coefficient, inbreeding depression; Cross breeding: heterosis, two-way cross (pure-breed cross), three-way cross, four-way crosses, two-way rotation (crisscross), three-way rotation (crisscross), introgression, grading-up, synthetic breed.

#### **AS 3206 Climatology and Animal Production (2: 15/30/55)**

Definition of climate; Classification of climatic regions; Climatic factors; Assessment of climate; Study of climatic factors in relation to animal production; Light: natural and artificial light, mechanism of light action, photoperiod and light responses, importance of light in production of animals and birds; Introduction of breeds into different climatic regions; Agro meteorology and weather forecasting for Animal Husbandry activities; Microclimate modification in animal houses; Estimation of microclimatic conditions in Animal house: measurement of Temperature, Relative humidity, Air Velocity and Mean temperature of the surrounding, measurement of intensity of light in animal houses; Construction of climographs and hythergraphs; Estimation of cooling power of atmosphere; Heat tolerance test in bovines.

#### **AS 3207 Animal Disease, Hygiene and Public Health (2: 15/30/55)**

Introduction to Bacteriology. Nomenclature. Principles of clinical examination of farm animals. Causation, pathogenesis, epidemiology, diagnosis, treatment and prevention of common bacterial and viral diseases in farm animal, poultry and fish. Pathogenesis and treatment and control of viral diseases and bacterial disease. Definitions of parasites, hosts, and life cycles. Pathogenesis of parasites and treatment of parasitic infections due to nematodes, cestodes, protozoa, arthropods. Protozoa disease in farm animal. Metabolic disorders of pregnancy and post-partum period. Environmental influence on animal production. Prophylaxis and management of newborn animals (day old chicks, kids, lambs, piglets, calves). Congenital and hereditary diseases. Microbiological control of animal foodstuff and water. Diseases induced by inorganic and organic poisons and poisonous plants. Factors which influence animal health: external (soil, water, light, climate etc.), internal (age, sex etc.) Farm Hygiene (microclimate, disinfection). Prevention of pathological and infectious diseases of the reproductive system. Animal rendering. Veterinary and public health aspects of manure handling in large scale animal production units. Animal transportation and quarantine. Disorders of metabolism. Inspection and quarantine of animals. Animal transportation. Principles of Immunology. Immune response. Immunoassays. Vaccine production and administration in farm animals.

#### **AS 3208 Feed and Feeding Practices in Aquaculture (2: 15/30/55)**

Nutritional requirements of cultured fish: energy requirements, protein and amino acid requirements, lipid and fatty acid requirements, vitamins and mineral requirements, carbohydrate requirements; Fertilizers in aquaculture: pond

natural food web, liming, organic manures, fertilization frequency and fertilization regimes; Role of live food organisms in aquaculture: microalgae, zooplankton, larval feeding, feeding strategy for larval culture; Compound aqua feed: feed ingredients and feed formulation, types of aqua feed, additives in aqua feed; Global impacts of ingredient use: fishmeal and oil, energy and carbon emissions, water use and pollution; Feed management: feeding methods and frequencies, compensatory growth, feeding equipment.

#### **AS 3209 Micro Livestock Production (2: 15/30/55)**

Livestock development and poverty; livestock products and their role; livestock and the environment; Introduction on micro livestock species; advantages and limitations of micro livestock; micro livestock breeds: micro cattle, micro goats, micro sheeps, micro pigs; poultry: chickens, ducks, geese, guinea fowl, muscovy, pigeon, quail, turkey; domestic rabbits; rodents; management of micro livestock: housing, feeding, breeding, disease control.

#### **AS 3210 Animal Behaviour and Welfare (2: 15/30/55)**

Introduction to Animal behaviour; Importance of animal behaviour studies; Patterns of behaviour; Daily and seasonal cycles of behaviour; Physiological basis of behaviour; Environmental modification of behaviour; Developmental changes in behaviour; Genetic differences in behaviour; Behavioural disorders; Group formation: social relationship, process of socialisation locality and behaviour; Practical application: behavioural character for management practices; Favourable and unfavourable behaviour for domestication; Behavioural adaptations under domestication. Physical environment and behaviour; Common vices and their remedial measures; Analysis of behaviour in relation to location; Analysis of behaviour in relation to climatic environment; Analysis of social behavior.

#### **AS 3211 Integrated Livestock Farming Systems (2: 15/30/55)**

Global livestock production systems; Description of different farming systems in Sri Lanka; Concept of complementarity and synergy; Principles of integrated farming; Scope and limitation of integrated farming systems; Sustainability of integrated livestock based farming systems and their economic importance; Crop-livestock integration; Livestock based integrated farming systems in different agro-ecological zones of Sri Lanka; Livestock-field crops integration; Livestock-plantation crops integration; Livestock-minor export crops integration; Criteria for evaluating crop-livestock systems; Livestock-fish integration; Livestock-rice-fish integration; Linkages and interaction among biogas units, cattle and buffalo units, goat and sheep units, poultry unit, piggery and rabbitry. New approach for changing farming systems in present energy crises.

#### **AS 3212 Animal Biodiversity and Conservation (2: 15/30/55)**

Economic importance of biodiversity; Importance of biodiversity in food security; Current status of biodiversity in Sri Lanka; Classification of biodiversity; Importance of biodiversity in animal genetic improvement; Livestock genetic

diversity: estimation of genetic diversity, indigenous animal biodiversity and its importance, loss of biodiversity in livestock, threats to livestock biodiversity; Conservation of animal biodiversity: convention on biological diversity, phylogenetic analysis of farm animal biodiversity; Biodiversity policies in Sri Lanka: meta population ecology, species-area relationships, island biogeography theory and extinction debt, central role they place in conservation theory; Key mechanisms of biodiversity loss: habitat loss and fragmentation, invasive species and climate change.

#### **AS 3213 English for Animal Science - Level I (1: 00/30/20)**

**Listening:** Listen to local speakers' & native speakers' recordings on field related lectures, discussions and presentations and audio recordings. **Speaking:** Introduce and an object/ a person/ a theme; Present researched/reviewed findings at a formal/informal forum; Deliver a short speech on interested topics, Debating an issue (general/field related). **Writing:** Interpret data from diagrams; Write report about a field visit/practical; Paraphrase a passage; Write scientific articles for publications; Summarize a passage. **Reading:** Read to comprehend a passage and answer relevant questions; Read to summarize a passage; Review relevant reading materials for research purposes. **Vocabulary:** Guess meaning of unknown words from the context; Vocabulary building from a root word by adding prefixes/suffixes. **Grammar:** Sentence expressions; Active/passive.

#### **AS 4101 Ruminant Nutrition (2: 15/30/55)**

Evaluation of the feed resources for livestock in Sri Lanka. Methods of maximizing profits by reducing feed costs under local conditions, recent advances in energy, protein and mineral nutrition, Formulation of rations for different functional groups of cattle, nutrition for beef cattle, buffaloes, sheep and goats.

#### **AS 4102 Monogastric Nutrition (2: 15/30/55)**

Feed industry of monogastric animals; embryo nutrition; energy evaluation in monogastric animals; protein requirements of monogastric animals; protein evaluation methods; digestibility concept for monogastric animals; nutrient balance; animal calorimetry concepts; feed additives for monogastric animals; feed formulation for monogastric animals; mineral nutrition; rabbit nutrition.

#### **AS 4103 Physiology of Cattle Reproduction and Lactation and Endocrinology (2: 15/30/55)**

Sexual development and differentiation; Developmental physiology: hormonal mechanisms during pregnancy and parturition; Physiology of male reproduction: evaluation of semen quality and standards; Artificial Insemination: problems at farm level application in Sri Lanka, fertility problems in cattle; Synchronization of estrous; Reproductive disorder and their therapeutic management; Reproductive endocrine system: endocrine glands, hypothalamic and pituitary hormones, hypothalamic control of the pituitary, gonadal, adrenal, placental, and uterine hormones, feedback regulation to control hormone concentrations, secretion, and effects (Male and Female) and cellular receptors for hormones; Recent advances

in reproductive physiology: effect of environment on reproduction; Histology of parenchyma and cellular organization of mammary epithelial cell; Mamogenesis and lactogenesis; Milk synthesis and secretion; Biochemical and molecular control of mammary gland.

#### **AS 4104 Advanced Livestock Breeding (2: 15/30/55)**

Commercial application of inbreeding and cross breeding; Identification of animal genetic resources in Sri Lanka; Quantitative trait loci (QTL), mapping and marker assisted selection; Selection models; Heritability estimation by full sib analysis; Estimation of breeding value; Best Linear Unbiased Prediction of breeding value; Use of genetic markers in prediction of breeding values; Predicting response to selection; Genomic selection; Accuracy of selection; Evaluation of the breeding programme: measuring genetic improvement, genetic trend, selection limits, practical issues influencing response to selection, genotype by environment interaction, solution to undesirable correlations; Characterization of non-descriptive farm animals; Genetics of inherited abnormalities; Breeding plans for poultry, swine, rabbit, goat and sheep, and cattle and buffalo.

#### **AS 4105 Culture of Ornamental Fish and Aquatic Plants (2: 15/30/55)**

Ornamental fish and aquatic plant industry; Types of aquarium; Setting up an aquarium; Aquarium maintenance, Management of ornamental fish: water quality parameters, nutrition and feeding; Culture of coral reef fish; Culture of marine invertebrates; Culture of freshwater ornamental fish; Breeding of selected aquarium fishes: live-bearers, egg-layers, spawning methods, spawning facilities; Pest and disease conditions in ornamental fish; Ornamental aquatic plants: water quality and filtration, substrates, methods of collection, propagation and transport.

#### **AS 4106 Meat and Dairy Technology (2: 15/30/55)**

Slaughtering and dressing, cuts, composition and structure of meat; Anti-mortem and post-mortem glycolysis of meat products; Physiological aspects: muscle proteins and lipid profile; Factors affecting muscle function and composition; Keeping and eating quality of meat, properties of fresh meat, odour, colour, water holding capacity, texture profile and artificial tenderization; Stress on the animal: stress and the meat quality such as PSE and DFD in meat quality; Comminuted meat; preparation of various kinds of fresh and cooked meat; Products: canning, heat processing, sausages, ham, bacon, barbecuing; Principles of packaging; Product characteristics affecting packaging requirements; Packaging material and their characteristics. Principles and practices of production of high quality milk; Advances in methods of chilling and preservation of milk; Thermal processing of milk, principles and methods, types of UHT-processing plants; Bacteriological, physical, chemical and nutritional effects of processing on milk; Processing of liquid milk, fermented milk products, cheese, ghee, butter, ice-cream, sweetened-condensed milk and dried milk powder; Preservation of milk and platform test; Packing, storage and marketing of milk products; Recent advances in utilization of dairy byproducts in product development, preservation of milk products.

#### **AS 4107 Mineral Nutrition in Ruminants (2: 15/30/55)**

Importance of minerals in animal feeding; Mineral content of feed resources; Techniques in mineral analysis and estimation of requirements; Absorption, metabolism and excretion of essential minerals; Interaction of minerals in animal body; Mineral related deficiencies and toxicities.

#### **AS 4108 Shrimp Production Technology (2: 15/30/55)**

Global shrimp production; Geographical locations of shrimps; Shrimp pond design and construction; Pond preparation; Facilities for shrimp farming; Shrimp species and physiology; Soil and water management; Feeds and feeding of shrimps; Culture of shrimps; Disease control; Supra-tidal and inter-tidal zones for shrimp farming; Reproductive biology of shrimps; Artificial spawning: Broodstock selection and management, Management of post-larval production and systems; Hatchery and nursery management; Water quality management; Harvesting and marketing of shrimp; Environmental pollution and mitigation

#### **AS 4109 Egg and Fish Processing Technology (2: 15/30/55)**

Egg anatomy and its biological importance; Defense mechanism in eggs; pathogens of eggs and egg products; culinary properties of eggs; Processed egg products: Whole egg, egg yolk, egg albumen, liquid egg product, frozen egg product, dried egg product, concentrated egg product, blended egg product, egg powder; liquid egg processing; dried egg processing; cooking and other applications; Egg substitutes. Gross chemical composition of fish; Biochemical dynamics and the quality of fresh fish; Methods of identifying raw and processed fish; Preservation of fish by curing; Surimi and fish-mince products; Chilling and freezing of fish; Canning fish and fish products; HACCP and quality assurance of seafood.

#### **AS 4110 Chicken Embryology and Hatchery Technology (2: 15/30/55)**

Introduction, biosynthesis of egg; fertilization; pre-laying and post-laying development of egg; events in embryonic development; hatchery requirements; methods of incubation; incubators; hatching egg management; setter and hatcher management; effects of temperature, humidity, ventilation, turning of egg, position of egg and candling on the hatchability of eggs; factors affecting hatchability; factors influencing chick size; malpositions of the embryo; critical periods of embryo development; hatchery services (sexing, vaccination and debeaking); chicks transportation; hatchery waste disposal; hatchery sanitation; hatchery records and performance evaluation.

## AS 4111 English for Animal Science - Level II (1: 00/30/20)

**Listening:** Listen to audio recordings of International Standardized Tests; Listen to discussions on general and academic related topics to express opinions and instructions to create an object/find solution to problems. **Speaking:** Familiarize items tested at the International Standardized Tests; Present points/ideas/findings to academic audience; Deliver lectures on selected/ specialized topics; Interview people for the purpose of collecting data. **Writing:** Report based on critical analysis; Writing articles for journals/book chapters based on research/review; Writing based on the topics in the International Standardized Tests; Writing long essays on a given topic. **Reading:** Practice reading activities on the International Standardized Tests; Read scientific items published in a book/ newspaper.



## CROP SCIENCE

The advanced programme in Crop Science is designed to cover the diverse discipline of field crops, horticultural crops, floriculture, forestry, protected culture, organic agriculture, agronomical and physiological aspects of crops and necessary management skills associated with social and environmental issues. Agriculture will become more intensified in the future with more land being used for non-agricultural purposes. New feasible and highly potential techniques as well as new concepts have been introduced into crop production system. The advanced courses address the constraints and limitations in the present crop production technology and approaches to overcome these problems with advanced techniques that have been recently introduced. After successful completion of this course, the students will have knowledge and skills on advanced technology in order to ensure the sustainability of crop production.

Course Code	Course Title	Credit Units
<b>6<sup>th</sup> Semester</b>		
CS 3201	Crop Physiology	(2: 30/00/70)
CS 3202	Plant Biotechnology	(2:15/30/55)
CS 3203	Vegetable Crop Production	(2:15/30/55)
CS 3204	Rice Production Technology	(2:15/30/55)
CS 3205	Protected Agriculture	(2:15/30/55)
CS 3206	Fruit Crop Production	(2:15/30/55)
CS 3207	Cropping Systems	(2:30/00/70)
CS 3208	Export Agricultural Crop Production	(2:30/00/70)
CS 3209	Weed Management	(2:15/30/55)
CS 3210	Organic Farming	(2:15/30/55)
CS 3211	Crop Experimentation	(2:30/00/70)
CS 3212	Permaculture	(2:15/30/55)
<b>7<sup>th</sup> Semester</b>		
CS 4101	Design and Analysis of Experiments	(2:30/00/70)
CS 4102	Non-parametric Statistics	(2:30/00/70)
CS 4103	Application of Statistical Software in Data Analysis	(2:00/60/40)
CS 4104	Sustainable Agriculture	(2:15/30/55)
CS 4105	Climate Change and Crop Production	(2:30/00/70)
CS 4106	Plant Tissue Culture Technology	(2:15/30/55)
CS 4107	Commercial Seed Production	(2:15/30/55)
CS 4108	Commercial Nursery Management	(2:15/30/55)
CS 4109	Commercial Floriculture	(2:15/30/55)
CS 4110	Advanced Field Crop Production	(2:15/30/55)
CS 4111	Dry Farming	(2:15/30/55)
CS 4112	Urban Horticulture	(2:15/30/55)

Sixth semester: 12 credits – 6 subjects should be taken by students (1 compulsory + 5 optional).

CS 3201- compulsory subject in Department of Crop Science

Seventh semester: 10 credits – 5 subjects should be taken by students (1 compulsory + 4 optional).

CS 4101- compulsory subject in Department of Crop Science

### **CS 3201 Crop Physiology (2: 30/00/70)**

Define and distinguish Crop physiology and plant physiology. Effects of temperature, light, photo period and humidity, radiation interception by crop canopies, photosynthetic efficiency, water use efficiency and drought tolerance, source – sink relationship, photosynthesis and respiration, nitrogen use efficiency and fixation, flower induction, partitioning and translocation of assimilates, yield attributes and yield improvement.

### **CS 3202 Plant Biotechnology (2: 15/30/55)**

Introduction to Plant Biotechnology, Basic tissue culture techniques, Enzyme technology, Microbial inoculation of plants, Protoplast fusion, Recombinant DNA technology, Restriction enzymes, Vectors for gene transfer, Gene cloning, Direct and indirect methods of gene transfer, Construction of genomic library, Transgenic plants, DNA fingerprinting, Application of plant biotechnology in Agriculture, Study tour.

### **CS 3203 Vegetable Crop Production (2: 15/30/55)**

Introduction, Vegetable based cropping systems, Production technology for upcountry and low country vegetables, Modern practices, Crop improvement, Institutional support, Field visits.

### **CS 3204 Rice Production Technology (2: 15/30 /55)**

Origin and History, Growth, and Development of the Rice Plant, The Climatic Environment and its Effects on Rice Production, Systems of Rice Culture, Land Preparation for Rice Soils, Water Use and Water Management Practices for Rice, Mineral Nutrition and Fertilizer Management of Rice, Insects, Diseases, and other Pests of Rice and Their Control, Weeds and Weed Control in Rice, Modern Rice Technology, Constraints, and World Food Supply.

### **CS 3205 Protected Agriculture (2:15/30/55)**

Introduction, Protected house structures and their modifications, Environment control techniques, Management of high value crops in protected houses, soilless culture, sanitation and plant protection in protected culture, Field visits.

### **CS 3206 Fruit Crop Production (2:15/30/55)**

Scope and importance of fruit culture, Classifications of fruit trees, Orchard planning, establishment and management, Use of plant hormones and growth regulators in fruit production, Crop establishment and management aspects of fruit crops; Banana, Mango, Papaya, Pineapple, Citrus, Passion, Avocado, Rambutan, Grapes, Cashew, Dragon fruit, minor fruits and Apple.

### **CS 3207 Cropping Systems (2: 30/00/70)**

Introduction, Principles, Classification, Cropping and farming systems of Sri Lanka, Monocropping and Multiple cropping, Advantages and disadvantages of monocropping and multiple cropping, Factors affecting selection of components of multiple cropping, Different cropping systems adapted in Sri Lanka, Plant interaction and competition, Selection and designing of cropping systems for different situations, Evaluation of productivity of different cropping systems, Integrated farming systems in Sri Lanka.

### **CS 3208 Export Agricultural Crop Production (2:30/00/70)**

Introduction, Ecological requirements, Agronomy and processing of Tea, Rubber, Coconut and minor export agricultural crops of Sri Lanka.

### **CS 3209 Weed Management (2:15/30/55)**

Weed ecology, adaptations, crop weed interactions, losses caused by weeds, competition for light, space, moisture and nutrients, Allelopathy effect on crop growth and yield, competitive ability of crops against weeds, critical period of crop weed competition, economic uses of weeds. Methods of weed control and their merits and demerits, Integrated weed management, classification of herbicides, formulation, time and method of application, mechanism of action and selectivity, Mode of action, Recent trends in weed management, herbicide tolerance, bio-herbicides, control of noxious weeds, parasitic weeds and aquatic weeds. Economics of different weed control methodology.

### **CS 3210 Organic Farming (2: 15/30/55)**

Organic and alternative crop production, Organic and low input cropping systems, Development and management of organic farms, Nutrient management in organic and low input systems, Biodynamic cropping, Research trends in organic farming, Plant protection in alternative cropping, Organic farming in Sri Lanka, Future trends in organic farming, Standards, regulations and Policies, Organic agriculture: key indicators and leading countries, The global market for organic food & drink.

### **CS 3211 Crop Experimentation (2: 30/00/70)**

Ways to reduce unexplained variability, Uniformity trial, Spacing trial, Systematic design, Competition effects, Intercropping experiments, Stability analysis, Plant growth curve, Fertilizer response curve, Yield density models, Multiple regression and residual analysis, Missing plot techniques.

### **CS 3212 Permaculture (2: 15/30/55)**

Principles of permaculture, Natural patterns and methods of design, Healthy soil, Seed saving and nurseries, Market gardens, Integrated pest management, Integrated farming systems, Appropriate technology for Garden design, Diversity, Stability and continuity of yield, Soil conservation, Nursery Establishment and Propagation Techniques, Planning and Planting a food forest integrating animal systems.

### **CS 4101 Design and Analysis of Experiments (2: 30/00/70)**

Principles of experimental designs, Completely Randomized Design, Randomized Complete Block Design, Latin Square Design, Mean separation procedures, Factorial experiments, Modifications to factorial experiments, Analysis of Covariance, Confounding in factorial experiments, Incomplete Block Designs.

### **CS 4102 Non-parametric Statistics (2: 30/00/70)**

Scale of measurements, Importance of non-parametric statistical tools, Nonparametric hypothesis testing methods - One sample, two sample and more sample, Spearman and Kendall rank correlation coefficients, Nonparametric regressions.

### **CS 4103 Application of Statistical software in Data Analysis (2: 00/60/40)**

Using statistical software to analyze different types of data, analyzing different experimental designs and interpreting the results statistically.

### **CS 4104 Sustainable Agriculture (2:15/30/55)**

Introduction to Sustainable Agriculture, Adverse effects of present agricultural practices, Definition and objectives of Sustainable Agriculture, Characteristics of Sustainable Agriculture, Sustainable Vs. Conventional Agriculture, Sustainable Compost Application, Biofertilizers, Sustainable Pest Management, Sustainable weed management, Integrated Plant Nutrient System, Crop Livestock Integrated farming system, Conservation Agriculture, GIS for Sustainable Agriculture, Phytoremediation of organic pollutants, Biodiversity, Conservation and agricultural sustainability.

### **CS 4105 Climate Change and Crop production (2: 30/00/70)**

Climate, climate change and climate variability, greenhouse effect, global warming. Direct effects of increasing atmospheric CO<sub>2</sub> concentrations on photosynthesis, water relation, respiration, biomass accumulation and leaf area production. Implications of climate change for weed/crop competition.

### **CS 4106 Plant Tissue Culture Technology (2:15/30/55)**

Tissue culture techniques and its application, Organogenesis-meristem culture, Embryo culture, Somatic embryogenesis, Cell culture and secondary metabolites, Protoplast culture, Protoplast isolation and fusion, Haploid induction, Somatic hybridization, *In vitro* fertilization, Artificial seed production, Mutagenesis in plant tissue culture, *In vitro* germplasm conservation, Application of Tissue culture in Agriculture and Industry, Study tour.

### **CS 4107 Commercial Seed Production (2:15/30/55)**

Seed production principles: Self and cross pollinated plants, Generation system of multiplication, quality control, genetic purity maintenance, isolation and controlled pollination: Planting design, influence of agro-climatic factors on seed

production, season and time of sowing, selection of seed production area, planning and organising seed industry. Methods of seed production in self and cross pollinated crops: varieties and hybrids of paddy, blackgram, greengram, cowpea, tomato, brinjal, chillies, okra and gourds, seed production in vegetatively propagated crops: sugarcane, onion. Harvesting techniques, methods of harvest, drying principles, seed extraction and processing. Seed cleaning and drying, seed packaging storage and transport, Seed industry in Sri Lanka.

#### **CS 4108 Commercial Nursery Management (2: 15/30/55)**

Introduction, Classification of commercial nurseries, Site selection, Nursery structures, Propagators, Mother plant selection and management, Selection and preparation of potting media, Containers used for potting, Management strategies in commercial nurseries, Production of planting materials, Nutrition management and plant protection in nurseries, Acclimatization and training, Certification.

#### **CS 4109 Commercial Floriculture - (2:15/30/55)**

Importance, Establishment of commercial cut flower and foliage nursery, Propagation methods and structures, Characteristic of cut flowers required for commercial purpose, Commercial production of cut flowers, ornamental foliage and potted plants, Harvesting, grading, post harvest treatments and packing for export markets, Export regulations, Modern production techniques, Value addition and preservation, Crop improvement, Study visits.

#### **CS 4110 Advanced Field Crop Production - (2: 15/30/55)**

Modern practices in crop production grain legumes, coarse grains, millets, oil seeds, sugar cane, potato, cotton, tobacco and condiments. Population dynamics, geometry and yield, Potential cropping zones, Cropping planning and time of planting, Monoculture and mixed cropping systems of cultivation, Involving, various crops and their interactions, Potential productivity, Identification of critical stages for input requirement, yield gap and constraints in production, Rationale for crop diversification, Weed management, Yield components and estimation, By products of commercial importance, Case studies of selected crops and recent research development for future needs.

#### **CS 4111 Dry Farming (2:15/30/55)**

Drought: definition, types and effect on crop production, Factors affecting crop production in dry farming regions, climatology, rainfall types, distribution and reliability of rainfall, effect of temperature, humidity and wind on soil moisture and crop growth in dry farming regions, soil types and characters, soil moisture deficit, traditional cultivation practices, integrated dry land development technology and its components. Soil moisture conservation: Principles and practices, reduction of loss of soil moisture through evaporation and transpiration: mulching, anti-evaporant and anti-transpirants, rainfall use efficiency in cropping systems, sequential cropping, and climatological approach for crop planning. National and International Institutions, Agencies and schemes for development of dry farming regions.

## CS 4212 Urban Horticulture (2:15/30/55)

Introduction, urban demand, crop diversification and sustainability, Factors influencing urban horticulture, Agronomic techniques, New trends, Community gardens, Organoponics, Hydroponics, Aeroponics, Roof gardening, Container gardening, vertical gardens, Field visits.



## COMMON COURSES

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

History of the computer systems, Basic concept of Information Technology and application areas of Computer. Logic operations: Basic logic operators and logic gates, Boolean algebra, Karnaugh map, Basic circuit design. Number system: Binary number system, Octal number system, Octal number system, Hexa-decimal number system, Decimal to Binary, Decimal to Octal, Decimal to Hexa-decimal conversion, Binary to Decimal, Octal to Decimal, Hexa-decimal to decimal conversion, Binary coded Octal, Binary coded Hexa-decimal. Components of a computer system, Basic overview of a computer system, Hardware, Software, System interfaces, Computer networks: Basic concepts in networking, Wired networking, Wireless networking, Network connectivity medias, Network devices, Network topologies, Internet and E-mail, Computer viruses, Overview of new technologies in Information Technology, Introduction to Programme design and Programming using C++: Control structures, looping, array, function.

### **CC 1102 English (Level I) (1:15/00/35)**

Reading: Comprehension passages notice and instructions, transfer information from charts, graphs, maps. Writing: Sentence patterns and grammar structures, importance of vocabulary, subject matter glossary, summarizing, skimming and scanning of texts, process writing, practical recording, writing reports, notes, memo, notice, advertisement, informal letter *etc.* Description of a person, place, picture and incident. Listening: Discussions, debates, interviews, films, documentary, Radio and TV news, understand, taking notes and feedback. Speaking: Self introduction, describing places, favourite items, past experiences, events and incidents. Dialogue on given situation, Computer aided language learning, communication.

### **CC 1103 Introduction to Social Harmony (1:15/00/35)**

Introduction to social harmony: What is social harmony. Importance, Nature and scope of social harmony. Basic theories of social harmony. Approaches to social harmony. Elements that create social harmony: Violence: Ragging. Substance abuse. Gender inequality. Local discrimination: Caste, lack of resources for students. Segregation. Ethnicity. Culture & Society. Religious conservatism and fanaticism. Economic inequality. Social mobility. Historical background to the social disharmony. Pre &- colonization & non colonization. Exploitation of human & resources. Expansion of religion. Ethnic cleaning. Current thinking & issues. The role of world religions to promote social harmony: Hinduism, Buddhism, Christianity, Islam, Dialogue among world religions. Education on human values: Tolerance, compassion, sympathy, honesty, friendship, kindness, helping attitude.

### **CC 1201 English (Level II) (1:15/00/35)**

Reading: Subject related essays and summary, news papers, magazines, research articles *etc.* Writing and grammar: Formal and informal writing, answering questions, report writing, communication and feedback, short description,

reading and reporting on editorials, technical writing, model reports, CV writing and filling applications. Listening and Watching: Recordings of local and native speaker, TV and Radio news. Speaking: Description of a person, place, past events, pictures. Storytelling, presentation of a selected topic, Demonstration of a process, group discussions, telephone and interview skills, Role play, facing interviews, presentation and short speeches, guided writing, addressing at different forum.

#### **CC 1202 Career Development (Module 1) (1:00/30/20)**

Introduction to Career Development: Taking personal responsibility for self-development: self-driven and life-long nature of career development; using motivated behavior for future success, Current and emerging trends in the local and overseas job markets for graduates, Forces driving the new economy and ways to capitalize on available opportunities; Making the best of opportunities available to university students within and outside the campus for career development; Effective transition from school to the university: Attitudes needed for success in university and subsequent world of work, The art of living with others and developing effective relationships, Understanding industry expectations for fresh graduates; Self-evaluation of students' awareness, attitudes and attributes; Effective study skills and motivated goal-directed learning; Personal organization and life management: Time management, Managing stress and handling interpersonal conflicts, Achieving and balance between mind, body and spirit; Programming for future success: Personal SWOT analysis, Developing a personal vision, Goal setting.

#### **CC 1203 Basic Sinhala (1: 15/00/35)**

Introducing Sinhala alphabets, constructing simple words using the alphabets, Introduction to nouns and their different varieties, simple sentence structure, basic in sentence patterns, simple reading and writing exercises, Sinhala grammar and usage (passive voice, case, etc.), practical language training, introduction to simple literature in Sinhala language, practical listening and comprehension, introduction to modern Sinhala literature.

#### **CC 1204 Basic Tamil (1:15/00/35)**

Introducing Tamil alphabets, constructing simple words in Tamil, Introduction to nouns and verbs, simple sentence making, basic in sentence patterns, reading and writing exercises, grammar and usage, practical listening and comprehension.

#### **CC 2101 Career Development (Module 2) (1: 00/30/20)**

Understanding organizations and how they function: Roles and functions of managers, Understanding management styles and getting along with your supervisor, Organizational culture/ climate; Understanding leadership and its role in modern organizations: Leading vs. managing, Important leadership theories and key issues related to exercising leadership, Motivating people at work: Influencing and persuasive skills, Employability skills: understanding important transferable skills and their relevance to the world of work and personal development, Effective personality attributes for a leadership role, Creating a sustainable competitive advantage: Personal branding, Impression

management; Understanding effective team work: Synergy, Resolving team conflict; The concept of emotional intelligence.

### **DED 3023 Entrepreneurial Practices (3:45/00/105)**

This course unit is designed to provide students with knowledge on the key theories and methods, which is related to the progress of starting up a new business. Students need to develop a new business by practicing those concepts taught in the class, step by step. This progress thorough whole class will bring students about the concept, attitude and skills of being a real entrepreneur. Contents: The nature of Entrepreneurship, Business opportunity identification, Product/service design, Business model design, Financial planning, Business plan writing, Business negotiation and Mental training for an entrepreneur.

### **MGT 3063 Public Management (3:45/00/105)**

This course unit is designed to provide students with depth knowledge and understanding about the nature and types of public organizations, their structural features, basic administration rules and regulations, and local government/district/provincial administration. Contents: Introduction to Public Management, Theory & Practice of Politics, Administrative Techniques, Introduction to Political System and Institutions, Introduction to Public Finance & Budgeting, Supervisory Management Techniques, Introduction to Public Policy, Public Financial Management, Local, Provincial & Municipal Government, Concepts of Local, Provincial & Municipal Government, Practices in Local, Provincial & Municipal Government.

### **HRM 3043 Organizational Change and Development (3:45/00/105)**

This course unit is designed to provide students with (i) an introduction to organizational change and development, nature of changes, organizational development practitioner, entering and contracting with organizational practitioners, (ii) insights on selecting organizational practitioner, developing into contract, diagnosing diagnostic models, organizations, groups and jobs and (iii) Design of organizational development inventions and evaluating effective organizational inventions. Content: General introduction to planned change and nature of planned change, The OD practitioner, Entering and contracting, Diagnosing, diagnostic models and diagnosing organizations groups and jobs, Collecting and analyzing diagnostic information, Feeding back and diagnostic information, Designing intervention and Leading Managing change, Evaluating and institutionalizing interventions / interpersonal interventions, Techno structural interventions and change management.

### **MKT 3023 Service Marketing (3:45/00/105)**

This course unit is designed to provide students with knowledge on the best current thinking on services marketing and management, through contemporary readings, current case analysis, and lectures, sensitize to services operations, service quality, and other elements of services which customers and service providers experience and immerse in the services issues facing a particular service firm, so that the students can apply their knowledge & skills in analysis and problem-solving. Content, Introduction to Services Marketing, Consumer

Behavior in a Services Context, Positioning Services in Competitive Markets, Developing Service Products, New Service Development. Distributing Service through Physical and Electronic Channels, Setting Prices and Implementing Revenue Management, Revenue Management, vices and Educating Customers, Designing and Managing Service Processes, Crafting the Service Environment, Managing People for Service Advantage, Managing Relationships and Building Loyalty, CRM, Complaint Handling and Service Recovery, Improving Service Quality and Productivity, Organizing for Change Management and Service Leadership.

### **CC 3201 Career Development (Module 3) (1:00/30/20)**

Habits of effective people (Covey's seven habits of effective people); Effective interpersonal communication: Eric Bern's transactional analysis, The concept assertive behavior and the use of assertive techniques; Dealing with difficult people; Dealing with conflicts: Conflict resolution modes, Principled negotiation, Mediation skills; Effective decision-making; Making effective presentations: Persuasive communication, Understanding the role of verbal and non-verbal communication, Overcoming speech apprehension; Projecting the right image: Role of dress code, Grooming for success, Effective mannerisms and etiquette; Preparation of CV and cover letter; Guidelines for facing job interviews.

### **CC 3202 Scientific Writing (1:15/00/35)**

Types of research, Proposal development, Writing: Introduction, Literature review, Materials and Methods, Research Methodology, Results and Discussion, Conclusions, Suggestions and Recommendation, Review report and Abstract, Presentation of analyzed data in Tables and Figures, Preparation of reference list, Scientific presentation, Writing Scientific manuscript and review paper.

### **CC 3203 English for Agriculture (1:15/00/35)**

Understanding information in a textbook; Taking notes from a text; Using present simple in a sentence; Writing compound sentences using coordinators; Subject-Verb agreement; Listening for the main and supporting ideas in a lecture; Reading and understanding main and supporting ideas; Identifying active and passive voice sentences; Writing lab reports using passive voice; Using sequence markers in a paragraph; Reporting practical sessions using passive voice and sequence markers; Understanding cause and effect and writing paragraphs; Presenting arguments for and against; The writing process: planning, writing the first draft, revising, editing and proofreading and publishing; Discussion: comparison and contrast paragraphs; Summary writing: organizing notes into summaries; Using signposting language; Understanding references in a text; Writing a research paper: content of a research paper, using in-text citations, references, etc.

### **CC 3204 English for Agribusiness Management (1:15/00/35)**

Understanding information in a textbook; Taking notes from a text; Using present simple; Understanding the purpose of a text; Recognizing important information in a text; Writing: linking language, sequencing and adding information; Comparison of adjectives; Writing sentences about similarity and differences; Listening to academic speech and taking down notes; Speaking: levels of

management; Reading comprehension - information transfer; Speaking: project planning techniques; Understanding and creating a Gantt chart; Interpreting line graphs and bar charts; Using adjectives and adverbs to describe trends; Reading and speaking: productivity trends; Writing sentences about trends using adverbs, the present progressive, the present simple tenses and prepositional phrases; Giving and supporting opinions, agreeing and disagreeing; Cause and effect; Expressing possibility - could, may and might; Using prepositions; Using evidence in a discussion; Past simple and present perfect; Referring to evidence: reporting verbs.

### **CC 3205 English for Business Writing (1:15/00/35)**

Writing a memorandum: format; An introduction to emails; Email structure; Conventions for salutations and complementary endings; Using subject headings and dates; Ways of opening and closing an email/letter; Asking for information; Beginning paragraphs; Formal informal phrases; Writing and replying to inquiries; Writing a successful CV; Writing an attractive cover letter; Presenting oneself in interviews; Making and confirming arrangements; Referring; Giving good news; Giving bad news; Expressing ability/inability; Making a mild complaint; Warning; Making a strong complaint; Verbally presenting a strong complaint.

### **CC 3206 English for Presentation and Meetings (1:15/00/35)**

Presentations: planning to make a presentation; Preparing to present and presentation techniques; Structure of a presentation: the introduction, the body and the end; Using images and making an impression; Using visual aids: general principles; Talking about the content of visual aids; Describing change; The middle of the presentation: holding the audience's attention, the main body, listing information, linking ideas and sequencing; The end: summarizing and concluding, questions and discussion; Meetings: arranging a meeting, confirming a meeting by email and rescheduling a meeting; Saying hello and making introductions; Starting a meeting; Stating the objectives; Reporting progress; Explaining cause and effect; Interrupting and dealing with interruptions; Asking for comments and contributions; Expressing strong and tentative opinions; Agreeing and disagreeing; Responding to offers; Buying time; Taking a vote; Summarizing the results of a meeting; Ending a meeting and thanking participants; Confirming decisions and action points; Follow-up emails; Saying goodbye.



## Examinations and Assessment

Each course will be assessed on a continuous basis within the semester. Every course will have more than one assessment, conducted at critical stages of learning of the course. Each academic year consists of two semesters and each semester comprises 15 weeks specifically with 75 working days. There will be eight end semester examinations during the four academic years for the Bachelor of Science Honours in Agriculture degree programme.

### Eligibility to Apply

#### Course Attendance

A student who does not have minimum of 80% attendance for both theory and practical classes will not be eligible to sit the end semester examination and shall be given “Not Allowed” (NA). The student will be considered as a repeat candidate when the examination is held next. **The highest grade given for such an attempt will be grade of “C”.**

Students should support the absence from course work due to illness by a valid medical certificate issued by the government hospitals or by University Medical Officer (UMO). Under exceptional circumstance only, medical certificates issued by other medical practitioners could be validated by University Medical Officer. A valid medical certificate means, a medical certificate issued by the following persons:

- University Medical Officer
- District Medical Officer
- Consultant specialist in the relevant field
- Head of a Government Base Hospital
- Medical Superintendent of a Ayurvedic/Government Hospital
- Ayurvedic Physician registered in Ayurvedic Medical Council

Students should obtain the prior permission by submitting a letter issued by the Director/Physical Education to the Dean of the Faculty to support the absence from course work due to inter Faculty, inter University or international sports activities. Representatives of the student union should submit an official document to the Dean of the Faculty to support the absence from course work due to official Union Meetings.

### Application Procedure

Applications for examinations will be entertained two weeks before the semester ends. Every application should be made on the prescribed form obtained from the Dean's office of the Faculty.

## Examinations and Assessment Procedures

### Evaluation Procedure

Course evaluation would include of continuous assessment during the academic semester and end semester examinations. Theory examination consists of the end semester examination and in course assessment (Quiz and Mid Semester). The Quiz and Mid Semester assessments should be conducted at the end of the 5<sup>th</sup> and 10<sup>th</sup> week respectively of the academic semester. The examination time allocations depend on the course credits and in course assessment will be confined to 35% of the total theory marks as given below.

Examination	≤2 credit Units (hr)	>2 credit Units (hr)	Marks (%)
Quiz	1/2	1/2	10
Mid Semester	1	1	25
End Semester	2	3	65

**The Quiz will not be repeated** and student will be given zero marks, if absent on the scheduled date of examination. It is compulsory for the students to sit the Mid Semester Examination for all the courses.

The practical component of the course will be assessed continuously and by the end semester practical examination. The marks for practical will be based on the Credit Unit allocated for the respective practical. The duration of the examinations will vary according to the number of units covered in the course. Oral examinations shall be a component of the practical assessment for certain courses. Appropriate assessment procedure/s, the percentage contribution of each assessment including independent learning will be determined by the Head of the Department in consultation with the course teacher in agreement with the assessment of Independent Learning. This will be informed to the students at the beginning of the semester. The student should pass theory and practical components of a course exam in the same sitting in order to pass the course.

**Student who fails in a subject should repeat both the theory and practical examinations when held next.** Student shall be permitted to **repeat the examination only THRICE within EIGHT academic years** from the time of registration.

All first and second year students should have passed 50% of the total courses by the end of second year second semester exams (first and second year examinations together). If a student fails to pass 50% of total courses at the end of second year examination he/she will not be permitted to proceed to the third year of study until the student completes the expected 50% pass level.

## Scheme of Grading

A 4-point scale will be adopted for grading performance of students for credited courses. The letter grade shall be awarded for each course. It is the measure of the quality of work done in a course. The grade will be given to the final rounded mark of each course. The cut-off marks for each grade and the corresponding grade points are given below:

% Marks	Grades	Grade Point
≥ 90	A+	4.0
80-89	A	4.0
75-79	A~	3.7
70-74	B+	3.3
65-69	B	3.0
60-64	B~	2.7
55-59	C+	2.3
50-54	C	2.0
45-49	C~	1.7
40-44	D+	1.3
35-39	D	1.0
<35	E	0.0

Note: Grade A+ will be given to those who obtained a distinctly high mark of ≥90% and are outliers of the marks distribution.

### Pass in a Course & Continuing Degree Programme

To pass a course, a student should achieve a minimum of 'C' grade for a credited course, a 'Satisfactory' level of pass (C grade) for a non-gradual course and a satisfactory level of attendance (80%) in audit course. A student who obtains any grade less than 'C' has to improve the grade up to a maximum of 'C' before completing the degree programme within FOUR academic years and is eligible to get a Class.

Classes will be awarded at the completion of the degree programme. **To be eligible for a class, a student should successfully complete the degree programme within FOUR academic years**, except for the situation accepted by the Faculty Board and approved by the University Senate and obtained the required GPA.

### Assessment of Project

The project work during the 8<sup>th</sup> Semester (Final Year) will be assessed continuously and the marks will be allocated as follows:

Proposal Presentation	~	10%
Student progress	~	20%
Project report	~	50%
Project Presentation	~	20%

The project presentation and the report of the Research Project will be assessed by a panel of examiners appointed by the Faculty Board. **The date of project presentation/last examination as decided by the Faculty Board will be considered as the EFFECTIVE DATE OF THE DEGREE** programme. Five copies of the final hardbound reports certified by the supervisor should be **submitted to the Head of the Department within one month from the date of presentation** for the release of results.

### **Assessment of Non-gradial Courses**

The non-gradial courses will be assessed on a satisfactory/ unsatisfactory basis and will not contribute to the Final Grade Point Average (FGPA). However, obtaining a 'Satisfactory' level (C grade) for a non-gradial course is mandatory to be eligible for the award of degree.

### **Assessment of Audit Courses**

To enhance the career opportunity of the students certain courses have been included in the curriculum as audit courses. The student should satisfy minimum of 80% attendance for such courses to be eligible for the award of a degree.

### **Assessment of Independent Learning (IL)**

The evaluation method of Independent Learning of each course would be decided by course teacher and evaluated at the proper time. However the allotted marks should not exceed 20% and 40% of the end semester examination of both theory and practical components of each course respectively.

### **Calculation of Grade Point Average (GPA)**

Grade point average will be calculated as the weighted average of grade points obtained from grades of different courses and the number of corresponding course Units. This aggregate index shall be called as Grade Point Average (GPA).

$$i.e: \quad GPA_1 = [\sum(C_{i1}G_{i1}) + \sum(C_{i2}G_{i2})] / \sum(C_{i1} + C_{i2})$$

$C_{i1}$	~	Credit of $i^{th}$ course in first semester
$C_{i2}$	~	Credit of $i^{th}$ course in second semester
$G_{i1}$	~	Grade point of $i^{th}$ course in first semester
$G_{i2}$	~	Grade point of $i^{th}$ course in second semester
$GPA_1$	—	Grade Point Average for first year

The Final Grade Point Average (FGPA) for the degree programme will be calculated at the completion of all requirements for the degree, as follows:

$$FGPA = A_i P_i$$

$A_i$	—	GPA of $i^{th}$ year ( $i = 1^{st}, 2^{nd}, 3^{rd}$ and $4^{th}$ year of study)
$P_i$	—	20,25,25,30 % of GPA of $1^{st}, 2^{nd}, 3^{rd}$ and $4^{th}$ year of Study

The FGPA will be rounded to the second decimal place.

## Award of Class

Classes will be awarded at the completion of the degree programme. To be eligible for a class, the requirements for the degree programme should be successfully completed within four academic years, except on grounds acceptable to the University Senate and obtained the required FGPA.

### Required FGPA for the award of class

Class	Minimum FGPA
First Class	3.70 and above
Second Class (Upper Division)	3.30 – 3.69
Second Class (Lower Division)	3.00 – 3.29
Pass	2.00 – 2.99

### Repeating the Examination

A student who has obtained grade C<sup>-</sup> and below in a particular course has to repeat the examination when it is held next in the faculty. A student can repeat the examination of a course only **THRICE** (3 repeat attempts only). The maximum grade for an examination repeated shall be **C**.

### Absence from Examinations

Except for any justifiable reasons to the Faculty Board and on the Medical grounds supported by a valid medical certificate, if a student gets absent from scheduled examinations will be considered as a **REPEAT candidate**.

Students are allowed to repeat the examinations of any course only **THRICE**. A student should complete all the courses required for the **award of degree within a period of 8 years** from the date of Registration/ enrolment at the Eastern University. Failing he/she shall not be awarded a degree.

When a student fails to appear for the examination due to illness should inform the Dean of the Faculty within 7 days from the date of examination. A Medical certificate should follow within 14 days to reach the Dean, Faculty of Agriculture.

## **BY- LAWS FOR THE EXAMINATION PROCEDURE, OFFENCES AND PUNISHMENTS**

Given below are the By-Laws for Examination Procedure, Offences and Punishments made by the Council of the Eastern University, Sri Lanka Under Section 135 of the Universities Act No:16 of 1978 as amended by Acts NO 7 of 1985 and No 26 of 1988 and enforced with effect from 29<sup>th</sup> August, 2015. **These By-Laws may be cited as the Examination Regulation By – Laws No.11 of 2015.**

### **GENERAL**

The Eastern University, Sri Lanka (hereinafter referred to as “the University”) hereby adopts these By-Laws as recommended by the Special Meeting of the Senate of the University (hereinafter referred to as “the Senate”) held on the 27/08/2015 and approved by the Council of the University (hereinafter referred to as “the Council”) at its 256<sup>th</sup> meeting held on 29/08/2015 being prepared under the provisions of the section 135 of the Universities Act No. 16. of 1978, as amended by the Universities (amendment) Act of No.07 of 1985 and No 26 of 1988. (herein after referred to as ‘the Act’).

- Examination of a course/course unit may consist of several assessment components (quizzes, within Semester and End-Semester examinations, term papers, assignments etc.).
- A Candidate is defined as a registered student of the University who is eligible to appear for the examination (hereinafter referred to as “Candidate”).

### **PART ~ I**

#### **Examination Procedure**

1. A candidate is expected to be outside the examination hall at least 15 minutes before the commencement of each paper, but shall not enter the hall until he/she is requested to do so by the Supervisor.
2. A candidate is permitted to carry into the examination hall only the pen, pencil and eraser. All other material/documents will be considered as unauthorized and it is an offence.
3. On admission of the hall, a candidate shall occupy the seat allotted to him/her and shall not change it except on the specific instruction of the Supervisor.
4. Candidates shall maintain silence from the entrance until they exit from the examination hall.
5. Candidates shall not be permitted to communicate with other candidates any means during the examination.
6. A candidate shall not be allow entering examination hall after 30 minutes of the commencement of the examination and allow leaving the examination

hall before 30 minute to the closure of the examination. However candidate shall not be permitted to leave the examination hall 15 minutes prior to the closure of the examination.

7. A candidate shall have his/her student record book/student identity card/admission card with him/her in the examination hall on every occasion he/she presents himself/herself for a paper. His/her candidature is liable to be cancelled, if he/she does not produce the student record book/ student identity card/admission card when requested to do so. The student's identity should be clearly visible during the time of the examination.
8. A candidate shall not have on his/her person or in his/her cloths or on the admission card, time-table, student record book/ student identity card, any notes, signs of formulae, etc., except those item that are permitted. All unauthorized items which a candidate has brought with him/her should be kept at a place indicated by the Supervisor/Invigilator.
9. No candidate shall copy or attempt to copy the scripts of another candidate. A candidate shall neither help another candidate nor obtain help from another candidate or any other person.
10. If any candidate was found to have copies from another candidate by an examiner at the time of marking, he/she would be treated as having committed a punishable offence.
11. No candidate shall submit a practical book or field book or dissertation/thesis or project study or answer script or assignment which has been prepared wholly or partly by anyone other than the candidate himself/herself. This section, however does not apply to group projects of students.
12. A candidate is permitted to bring authorized materials only.
13. Examination stationery (i.e. writing paper, graph paper, drawing paper, ledger paper, precise paper etc.) will be supplied in the Examination Hall, as and when necessary. No sheet of paper or answer book supplied to a candidate may be torn, crumpled, folded or otherwise mutilated. No papers other than those supplied to him/her by the Supervisor/Invigilator shall be used by a candidate. Log tables or any other material provided shall be used with care and left behind on the desk. All material supplied whether used or unused other than the answer scripts, shall be left behind on the desk and not removed from the examination halls.
14. Every candidate shall enter his/her Index Number at the appropriate place on the answer book and on every continuation paper. He/she shall also enter all necessary particulars as indicated in the cover of the answer book. A candidate who inserts on his/her script an Index number other than his/her own is liable to be considered as having attempted to cheat. The supervisor/Invigilator has the authority to check the answer scripts of the candidate. A script that bears no Index Number or an Index Number which cannot be identified is liable to be rejected. No candidate shall write his name or any other identifying mark on the answer scripts.

15. All additional work such as rough work, calculation shall only be done on the additional scripts given by the supervisor or invigilator at the time of examination. Otherwise it shall be treated as examination offence.
16. Any answer or part of the answer which is not to be considered for the purpose of assessment shall be neatly crossed out. If the same question has been attempted in more than one place the answer or answers that are not to be considered shall be neatly crossed out.
17. Candidates found copying, communicating with another candidate, or using any unauthorized materials may be expelled from the examination hall. A written report on the incident will be submitted by the invigilator through the Supervisor to the Examination Offence Committee.
18. Candidates are under the authority of the Supervisor and shall assist him/her by carrying out his/her instructions and those of the Invigilators, during the examination and immediately before and after it.
19. Every candidate shall conduct himself/herself in the examination hall and its precincts so as not to cause disturbance or inconvenience to the Supervisor or his/her staff or to the other candidates. In entering and leaving the hall, he/she shall conduct himself:/herself as quietly as possible. A candidate is liable to be excluded from the examination hall for disorderly conduct.
20. Candidate shall stop work promptly when ordered by the Supervisor/Invigilator to do so. If this instruction is not strictly followed, the Supervisor/Invigilator has the authority to make an endorsement to this effect on the answer scripts.
21. Absolute silence shall be maintained in the examination hall and its precincts. A candidate is not permitted for any, reason whatsoever to communicate or to have any dealings with any person other than the Supervisor/Invigilator. The attention of the Supervisor/Invigilator shall be drawn by the candidate by raising his hand from where he is seated.
22. During the course of answering a question paper, no candidate shall be permitted to leave the examination hall even temporarily. In case of an emergency, the Supervisor/Invigilator shall grant him permission to do so but the candidate shall be under his constant surveillance.
23. No person shall impersonate a candidate at the examination, nor shall any candidate allow himself/herself to be impersonated by another person.
24. Any candidate receiving unauthorized assistance from any person shall be deemed to have committed an examination offence.
25. If circumstances arise which in the opinion of the Supervisor render the cancellation or postponement of the examination necessary, he/she shall stop the examination, collect the scripts already written and then report the matter as, soon as possible to the Dean of the relevant Faculty.

26. The Supervisor/Invigilator is empowered to request any candidate to make a statement in writing on any matter which may have arisen during the course of the examination and such statement shall be signed by the candidate. No candidate shall refuse to make such a statement or to sign it. If such a candidate refuses to make such a statement or refuse to sign it, the Supervisor/Invigilator shall make his/her own statement and report the matter to the Dean of the relevant Faculty.
27. No candidate shall contact any person other than the Vice-Chancellor, Dean, Head of the Department, the Registrar or the relevant Senior Assistant Registrar regarding any matter concerning the examination.
28. Every candidate shall hand over the answer script personally to the Supervisor/Invigilator or, remain in his/her seat until it is collected. On no account shall a candidate hand over his/her answer script to an Attendant, a minor employee or another candidate.
29. A candidate who has handed over his/her answer script shall under no circumstances be entitled to call it back.
30. Any candidate who wishes to leave the examination early must have their script collected by the invigilator before they leave their desk.
31. No candidate shall remove his/her or any other candidate's answer script from the examination hall.
32. Every candidate who registers for a course/course unit shall be deemed to have sat the examination of that course/course unit unless he/she withdraws from the course/course unit within the prescribed period of dropping course/course units. He/she should submit a medical certificate in support of his/her absence, prior to the commencement of the examination. If such a document cannot be submitted before the commencement of the examination, a candidate shall inform of his/her inability to attend the examination, to the Dean of the Faculty within a week after the commencement of the examination. The medical certificate shall conform to the Senate regulations.
33. When a candidate is unable to be present for any part/section of an examination of a course/course unit, he/she shall notify or cause to be notified this fact to the Dean of the Faculty and the relevant Senior Assistant Registrar immediately. This should be confirmed in writing with supporting document by registered post within two weeks.
34. A candidate will be eligible for honours if all requirements for the award of honours are met within the prescribed period for the degree. However, candidates found guilty of an examination offence shall not be eligible for honours.
35. No candidate shall sit an examination of a course/course unit, if he/she has exhausted the number of attempts that he/she is allowed to sit that particular

examination, unless he/she has been granted special permission to do so by the Dean of the relevant Faculty.

## **PART ~ II**

### **1. Examination Offences and Punishments**

1. Any candidate who violates Examination Rule 08 shall be deemed guilty of the offence of possession of unauthorized documents/items and his/her candidature for the examinations of the Semester shall be cancelled and he/she shall be prohibited from sitting any examination of this University for a period varying from 1-5 semesters.
2. Any candidate who violates Examination Rule 09 or 10 shall be deemed guilty of the offence of copying and therefore his/her candidature shall be cancelled from the examinations of that semester and he/she shall be prohibited from sitting any examination of this University for a period of Five semesters.
3. Any candidate who violates Examination Rule 11 shall be deemed guilty of the offence of having cheated at the Examination and his/her candidature for the examinations of that semester shall be cancelled and he/she shall be prohibited from sitting any examination of this University for a period varying from 1-9 semesters.
4. Any candidate who is detected removing examination stationary and other materials provided for the examination (Rule 13) shall be deemed guilty of an examination offence and his/her candidature for the examination of that semester shall be cancelled and he/she shall be liable to be prohibited from sitting any examination of this University for a period of Three semesters.
5. Any candidate who violates any one or more of the rules in 12, 18, 29, 20, 21 and 22 shall be deemed guilty of the offence of disorderly conduct and his/her candidature shall be cancelled from the examinations of that semester and he/she shall be prohibited from sitting any examination of this University for a period of Three semesters.
6. Any candidate who violates Examination Rules 23 shall be guilty of the offence of impersonation and his/her candidature for the examinations of that semester shall be cancelled and he/she shall be prohibited from sitting any examination of this University. Impersonator/s may also be liable to any punishment under the Penal Code/Criminal Law. In the event of the impersonator is found to be the Graduate of this University, his/her degree shall be withdrawn.
7. Any candidate who violates Examination Rule 24 shall be guilty of an examination offence and his/her candidature for the examinations of that semester shall be cancelled and he/she shall be prohibited from sitting any examination of this University for a period of 1-5 semesters.

8. Any candidate found aiding and abetting in the commission of any of the above examination offences shall be deemed to have committed that offence and shall be punished in respect of the offence in accordance with the provisions of the relevant section.
9. Any other offence which is not covered in this section alleged to have been committed by a candidate and reported to the relevant authority by a Supervisor/ Examiner shall be inquired into and appropriate action taken.

## **2. Examination Offences committed by the Candidates**

There shall be an Examinations Disciplinary Committee of not less than 03 members of whom at least one member is from outside the Faculty, appointed for each case by the dean of the respective Faculty to inquire into of make recommendation (including punishments) on examination offences report to it.

## **3. Classification of Offences**

**Examination offences may be classified as follows:**

- a. Possession of unauthorized documents
- b. Copying
- c. Cheating
- d. Removal of stationery.
- e. Disorderly conduct
- f. Impersonation
- g. Unauthorized assistance
- h. Aiding and abetting in the commission of above offences
- i. Other offences.

## **4. Procedure**

- 4.1 In all cases of violation of examination rules detected by the Supervisor he/she shall take action as outlined in this section and forward his/her report to the Registrar.
- 4.2 In cases of disorderly conduct the Supervisor shall in the first instance warn the candidate to be of good behaviour. Disorderly conduct shall be considered grave, only if such conduct in the opinion of the Supervisor is considered as causing a disturbance in the conduct of the Examination. Where the candidate persists in unruly or disorderly conduct and the Supervisor is of opinion that it was creating a disturbance in the conduct of the examination shall exclude the candidate from the examination hall and issue him/her a letter with the copy to the relevant Dean/Senior Assistant Registrar/Assistant Registrar, canceling his/her candidature from the examination.
- 4.3 In all other cases of examination offences detected, the Supervisor shall send a report to the relevant Dean along with any materials taken into custody. Materials taken into custody shall be authenticated by placing the signatures of the candidate and the Supervisor/Invigilator and the date, time and place

of detection. The supervisor's report should be countersigned by one of the invigilator.

**4.4** The Dean after preliminary inquiry shall place all reports of examination offences submitted by the Supervisors for action of the relevant Examination Disciplinary Committee for further action.

**4.5** Supervisor, Examiner, Head of Department, or any other official of the University who detects an examination offence, shall report the matter in writing to the Dean, who shall after preliminary inquiry submit his findings to the relevant Examination Disciplinary Committee for further action.

## **5. Final Decision**

The punishments recommended by the Examination Disciplinary Committee shall be submitted to the relevant Faculty Board for approval of the decision and it shall be referred to the Senate for ratification.

## **6. Appeals Board**

There shall be an Appeal Board, consisting of three members, appointed by the Vice-Chancellor to consider appeals regarding the decision referred to in Section 5.0 above. Any student on whom a punishment has been imposed may, within a period of 2 weeks from the date of communication to him/her of such punishment, appeal against such punishment to the Vice-Chancellor.

The Appeals Board shall have the power to review the decision referred in Section 5.0 above regarding the punishment imposed and may either affirm, vary as deem necessary or set aside the decision regarding the punishment.

## **Notes for the Final Year Research Project**

Welcome to the Faculty of Agriculture, Eastern University, Sri Lanka as a Research student. These notes indicate in general terms the Supervisor/student relationship, the responsibilities of the undergraduates students and Senior Lecturers and your opportunities to discuss general problems.

### **Supervisors and Research Advisors**

Each of you has a supervisor to guide you in the planning and execution of your research and to help in the preparation of your report.. Your Supervisor would discuss the progress of your work with you regularly and also whenever the need arises. Your supervisor is also responsible for arranging the provision of the appropriate equipment and material, glasshouse and growth room space (through the appropriate technical staff), field sites (through the Administrative staff) and travel to field sites and also for authorizing your other expenses. You should not feel inhibited in any way from seeking advice about your research from any member of staff, although as a matter of courtesy you should normally inform your supervisor of any extensive discussion.

### **Guidelines for the Preparation of Research Project Report**

Students are advised to follow the instructions given below in writing the Final year research project report for submission.

**The Research Project Reports should contain the following Chapters:**

1. Abstract
2. Introduction
3. Review of Literature
4. Materials and Methods
5. Results and Discussion
6. Conclusion
7. References
8. Appendices, if any

A Review Report, if undertaken, should contain the following Chapters:

1. Abstract
2. Introduction
3. Review of Literature
4. Summary and Conclusions / Policy Implications
5. Conclusion

The first page of the report must clearly indicate the Title of the Project and the Field of Specialization and Year. The report should be typed in Double space, font size 12, Times New Roman with a 4 cm margin at the left and 2.5 cm margin at the top, bottom and right edges. All tables and figures (including photographs) presented must be clearly numbered giving titles and appropriate statistical **significance indices wherever applicable. Project reports should be in between 80-120 pages.**

The cover of the bound report should be Dark green with the bound end having the following color strip.

Agric. Biology	~ Brown
Agric. Chemistry	~ Red
Agric. Economics	~ Gold
Agric. Engineering	~ Blue
Animal Science	~ Purple
Crop Science	~ Black

The project reports not confirming to the above format or submitted late will be rejected, and would be requested to be resubmitted.

### **Affiliated Units to the Faculty of Agriculture**

#### **University Library**



In fulfilling the main objectives of developing the Faculty through self studies and self impressments, the University and Faculty libraries play a major role. The library net work of the Eastern University comprises the Main Library and the branch library in the Faculty of Agriculture. There is a diverse collection of information resources in the libraries, especially in terms of the breadth and depth of coverage. The collection is multi-disciplinary, composing a variety of subjects related to the Departments and full range of services is provided including loans, inter-library loans, references and advisory services. The collection books are arranged using Dewey Decimal Classification (DDC) system. Anglo American Catalog using rules and regulations are used to catalog the collection. In addition to the books, the library collects project reports of the students and staff, research papers, conference proceedings, audio visual materials, past papers *etc.* The library collects its resources in three sections namely References, Lending and Periodical. At present, the library is actively involved in developing the e-information provision.

## Library Opening Hours

Monday to Friday : 8.00 a.m. ~ 6.00 p.m.

Saturdays : 8.00 a.m. ~ 4.30 p.m.

*(The Library will be closed on Sundays, Public Holidays and Poya days)*

## Lending Hours

Books from	Monday to Friday
Lending	8.30 a.m. to 5.00 p.m.
Scheduled Reference	1.30 p.m. to 5.00 p.m.

**\*No lending facilities on Saturdays**

## Department of English Language Teaching (DELT)

The English Language Teaching Unit was set up for the specific purpose of imparting English to the undergraduates who enter the University with varying levels of proficiency in English with a view to improving their knowledge of English to enable them to follow the courses and read the literature in English in their chosen disciplines. The medium of instruction in the Faculty Agriculture at the Eastern University is English and the students are required to answer all examination papers in the English Medium. The ELTU is therefore endeavors to impart sufficient knowledge in English in order that the students would be able to read, comprehend and collect facts from text books in English and other sources like electronic media, internet in their subjects of study.

The ELTU also conducts an intensive course during which, effort is directed towards improving general proficiency in English and the aspects taught include grammar and different language skills such as reading, writing and speech. The latter part of the intensive course is geared towards the development of skills to comprehend and reproduce subject material related to their field of study. The ongoing course provides approximately 2-3 hours of English per week throughout the students' University career. Facilities such as listening cubicles equipped with tape recorders are available. Video films of scientific, cultural and historical interest and a limited number of feature films are screened at regular intervals to motivate the students to improve their vocabulary and skills of speech. A special selection of books on a variety of topics is made available and inducement is provided to instill the reading habit among students. It should also be noted that programme are staged to show the talents of the undergraduates and they are also exposed to various skills at the Career Guidance programme for the Final year students.

## **Centre for Information and Communication Technology (CICT)**

The Centre for Information and communication Technology (CICT) is offering Computer Literacy and Application courses and conducting practical classes to all the First year students of all Faculties. The Unit is conducting Extension courses in Computer Science during weekends.

### **Faculty Computer Unit**

The Faculty Computer Unit was established in 2006 in order to provide services to undergraduate and postgraduate students and staff of Faculty of Agriculture. At present the computer unit has 20 fully networked computers and infrastructure facilities with lab space for 50 computers. Students are allowed free computer time for data analysis of their project work, computer applications in their course work and free internet access throughout the day. The computer unit facilitates and assists students to acquire computer literacy and strengthen their fields of study for better career opportunities. The unit is responsible for developing and maintaining the Faculty website and the Faculty network system. The Unit also provides internet and email facilities for the all Faculty members. Further, it provides a maintenance service for the hardware and software failures of computers and other peripherals of the entire Faculty.

### **Physical Education/Sports Facilities**

The Physical Education Unit is responsible for the organization and administration of Physical Education and recreational programmes of the University. Sports activities are promoted by the Sports Advisory Board and Sports Council. The Department of Physical Education provides facilities for the following sports disciplines at the University for students and Sports enthusiasts.

Football, Cricket M/W, Basketball M/W, Badminton M/W, Table Tennis M/W, Netball, Hockey M/W, Elle M/W, Kabaddi M/W, Volleyball M/W, Chess M/W, Fitness Culture, Karate M/W, Rugger, Weight Lifting, Athletics *etc.*

Inter-Faculty tournaments, Inter-University tournaments in the above mentioned sports are conducted every year. The Mini-Olympics Competitions are held every three years. University Colours are awarded to sportsmen and sportswomen performing well at recognized tournaments and meets approved by the Sports Advisory board.

A gymnasium is available for indoor games.

### **Career Guidance Unit**

The Career Guidance Unit (CGU) was established in the Eastern University, Sri Lanka in 2001 with the following objectives:

- To develop relations between University and Employment Sector in a mutually beneficial way.
- To help undergraduates to choose and proceed on an optimal career based on the students ability, desire and available opportunities.

- To help undergraduates obtain an orientation to the employment sector and develop Transferable skills such as Effective communication skills, Leadership skills, Team work skills and Managerial skills so that they will become productive and efficient members of the workforce.
- To liaise with private and public sector organizations to find out about existing job opportunities, bring them to the notice of graduates and direct the most suitable applicants to the organization.

Excellence, service and partnership are the foundations of the Career Guidance Unit of the Faculty of Agriculture. We are professional staff, dedicated to providing students, alumni and employers, with the finest career exploration, decision making and job search services. Our site highlights the services that are tailored to specifically meet the unique needs of the students. This unit conducts awareness programmes for students such as on employment opportunities in public and private sectors, global job market and self employment *etc.* The major objective of this unit are motivating and helping the undergraduates to seek out opportunities for developing themselves the qualities and attributes demanded by the today's world of work.

Career Guidance Unit of Faculty and the University organize several programmes to provide an opportunity for the prospective employees to meet the employers and to explore potential career opportunities. During the events, the employers have an opportunity to meet the Final Year undergraduates who will be passing out within the next couple of months as well as those who have recently graduated. The job seekers from several disciplines will be participating in the event.

### **University Health Centre**

Students who fall sick report to the Health Centre for treatment. In the Health Centre the sick are examined their names and their particulars are written in bed head tickets and the necessary treatment also written. The nurse issues the drugs. Dressing of wounds is done by the Health Services Attendant. The Labourer does the cleaning and other minor works of the Health Centre. The patients who need admission and specialized treatment are sent either to Chenkalady/ Eravur Hospital or to General Hospital, Batticaloa in the University vehicle.

If the students in the University Hostels are unable to come to the Health Centre for treatment, the Doctor visits them and provides necessary treatment. The sanitation of the University premises and the Hostels is looked after by the doctor. The University canteen and the hostel canteens and the Kitchens are visited by the Doctor and the cleanliness and any other regularities and necessities are reported to the University Registrar. Also on the Inter-Faculty and Inter-University sports days the Doctor is present.

## **Faculty Student's Union**

The Faculty has a Faculty Students Union. The Office bearers for this union are elected unanimously or secret ballot by all students of the Faculty. The Faculty Students Union officer's consists of the following members.

President  
Vice President  
Secretary  
Editor  
Junior Treasurer and Committee members

The period of the members elected for the student union is one academic year.

The duties and functions of the Faculty Students Union are as follows;

- to promote the corporate life and welfare of the student community of the Faculty,
- to take steps to encourage and further the academic interests of its students,
- to safeguard and protect the good name of the Faculty and Institution,
- to foster cultural and sports activities among the students of the Faculty,
- to make recommendation to the University Students' Union on matters pertaining to the disbursement of the funds and general welfare of the students community of the Faculty, and
- to ensure that all decisions of the Faculty Students' Union pertaining to the academic and welfare activities of the Faculty are taken by a majority vote of its members.

## **Student Counseling Service**

The University system is entirely different from the school system to which you are used to. Some students may have left their home towns and may feel unsettled in a new place.

A student Counseling Services organized in Universities to help new students with this transition into the University system and also to provide guidance throughout the University life.

Student Counsellors of the faculty can be consulted to help solve any problems related to academic, administrative, financial or personal. Each Faculty has one or more Student Counselors. There is a Senior Student Counsellor who is in overall charge of all students counseling activities.





*Faculty of Agriculture*  
**Eastern University, Sri Lanka.**