

Second Year First Semester Courses

No.	Code	Title	Credits
1.	AG 21012	Field Crops Production	2:15/30/55
2.	AG 21022	Plant Propagation and Nursery Management Techniques	2:20/20/60
3.	AS 21012	Applied Animal Nutrition and Forage Production and conservation	2:23/15/62
4.	AB 21012	Economic Entomology	2:15/30/55
5.	FS 21012	Biochemistry	2:20/20/60
6.	AE 21013	Water Resource Engineering	3:30/30/90
7.	EC 21012	Intermediate Microeconomics	2:30/00/70
8.	AC 21011	Social Harmony and Active citizen	1:00/30/70
Total			15

Second Year Second Semester Courses

No.	Code	Title	Credits
1.	AG 22012	Horticulture I	2:20/20/60
2.	AG 22022	Principles of Forestry	2:23/15/62
3.	AS 22012	Livestock Breeding and Health Management of Farm Animals	2:15/30/55
4.	AS 22023	Ruminant Management	3:23/45/82
5.	AB 22012	Basic Microbiology and Phytopathology	2:15/30/55
6.	FS 22013	Principles of Food science and Nutrition	3:30/30/90
7.	AE 22012	Land Surveying and Irrigation	2:23/15/62
8.	EC 22013	Agribusiness Management and Business Accounting	3:30/30/90
9.	AC 22011	Career Guidance and Skill Development	1:00/30/20
Total			19

Second Year First Semester - Core Courses (21000)

Course Title	Field Crops Production		
Course Code	AG 21012		
Credit Value	02		
Core/Elective	Core course		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	15	30	55
Objectives	Provide the student with the knowledge and skills on common and special agronomic practices adopted for field crops (except cereals), ecological requirements, phenology, growth, development, nitrogen fixation of legumes, harvesting, post-harvesting handling and value addition techniques of field crops		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Classify field crops based on their utility • Identify the ecological requirements of different field crops • Describe the phenology, growth, yield, and yield components of field crops • Demonstrate the agronomic practices to increase the productivity of field crops • Explain the nitrogen fixation and factors influencing nitrogen fixation in legumes • Propose the post-harvest operations and value addition techniques for field crops • Discuss the importance of cost-effective cultivation of field crops in Sri Lanka 		
Detailed syllabus	<p>Theory Types of field crops and their classifications; Ecological requirements of different field crops; Phenology; Growth; Yield and yield components of field crops; Production technology of important grain legumes, root and tuber crops, oil seed crops, spices and condiments, fiber crops, sugar and energy crops and tobacco; Special agronomic practices adapted to improve the quality of the end products; Nitrogen fixation in legumes; Processing and value addition of important field crops.</p> <p>Practical Classification of types of field crops; Identification of different varieties of field crops based on morphological characters; Type of leaves; Flower colour and structure; Seed characters; Identification of different phenological stages of field crops; Preparation of chilli nursery; Field establishment; Management and harvesting of important grain legumes, root and tuber crops, oil seed crops, spices and condiments; Visit to farmer</p>		

	fields and commercial farms to study the best practices adapted and exposure to the real world problems faced.			
Teaching and Learning Methods	Interactive lectures, tutorials, laboratory works, field practical, group assignments, discussions and presentations, problem-based learning, field visits			
Evaluation	Theory (50 %)		Practical (50 %)	
	Formative assessment (30%)	Summative assessment (70%)	Formative assessment (30%)	Summative assessment (70%)
	Quiz -10 % In-class test -15 % Assignments/ presentation - 5 %	Two hours Four out of five questions	Field practical Record - 20% Field visit - 10%	Practical exam - 30% Spot - 30 % Oral - 10 %
Recommended Readings	<ol style="list-style-type: none"> 1. Chandrasekaram, B., Annadurai, K. and Somasundaram, E. (2010). A Textbook of Agronomy. NEW AGE International Publishers (Pvt.) Limited. 2. Dandeniya, W.S. and Dharmakeerthi, R.S. (2020). Integrated Plant Nutrient Management in Major Agricultural Soils of Sri Lanka: A Review of the Current Status and the Way Forward. <i>Agricultural Research for Sustainable Food Systems in Sri Lanka</i>, pp.213-238.Springer, Singapore. 3. Department of Agriculture, Sri Lanka. Management of Field Crops (Web database). 4. Lebot, V. (2019). Tropical root and tuber crops. CABI. 5. Marambe, B., Jayawardena, S.S.B.D.G., Weerakoon, W.M.W. and Wijewardena, H. (2020). Input Intensification in Food Crops Production and Food Security. <i>Agricultural Research for Sustainable Food Systems in Sri Lanka</i> (pp. 215-248). Springer, Singapore. 6. Reddy, S. R. and Ramu, Y.R. (2004). Agronomy of Fields Crops. Edition 4. Kalyani Publishers. 7. Lakhwinder S Randhawa (2002). <i>Quality Improvement in Field Crops</i>. CRC Press 8. Srinivasan Jeyaraman (2017). <i>Field Crops: Production and Management</i>, CBS Publishers & Distributors Pvt Ltd, India; 2nd edition ISBN-13 : 978-8120418004 9. Chhidda Singh; Prem Singh and Rajbir Singh (2020). <i>Modern Techniques of Raising Field Crops 3rd Edition</i>. CBS Publishers & Distributors Pvt Ltd, India. ISBN-10:9389688493ISBN-13 : 978-9389688498 10. Anil Kumar Siroha and Sneh Punia (2021). <i>Millets: Properties, Processing, and Health Benefits</i>. CRC Press; 1st edition. ISBN-13 :978-0367562748 			

Course Title	Plant Propagation and Nursery Management Techniques		
Course Code	AG 21022		
Credit Value	02		
Core/Elective	Core course		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	20	20	60
Objective/s	Provide the students with knowledge and skills on how to produce, manage, and market quality planting materials by sexual and vegetative methods and nursery establishment and management		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Recall importance of the production of quality planting materials • Explain physiological aspects of propagation by means of seeds, cuttings, grafts and layers • List the advantage and disadvantages of different propagation methods • Outline the steps in establishing different types of nurseries • Exhibit the skill to produce plants by budding and grafting • Demonstrate different types of layering methods • Practice propagation of plants by cuttings • Discuss physiological processes affecting plant growth and development in protected environment systems • Explain the steps in micro-propagation • Select the explant, method of sterilization and other steps to produce plants using micro-propagation • Support to establish commercial level planting material supply units 		
Detailed syllabus	<p>Theory Importance of production of quality planting material; Sexual and asexual propagation methods; Tools and implements; Physiological and anatomical basis of vegetative propagation; Producing plants using cuttings, layering, grafting and budding; Factors influencing rooting of cuttings; layering, budding, grafting, Stock scion relationship, Root stock influences, Propagation through specialized organs, Types of nurseries, Site selection and ecological requirements for successful nursery establishment, land preparation, soil sterilization techniques, management of nurseries, caring of seedlings, hardening, transportation, Use of growth regulators in seed and vegetative propagation, Propagation structures: mist chambers, humidifiers, greenhouses, glass houses; Light, temperature and humidity effects in protected structures and their effect on rooting, Growth and development crops; Importance and principle of micropropagation; Stages of micropropagation; Types of explants; Sterilization techniques; Culture</p>		

	<p>media preparation and its composition; Type of cultures; Constraints and problems in micropropagation</p> <p>Practical</p> <p>Preparation of nursery beds; Seed treatment and sowing; Preparation of potting mixtures; Study different structures for propagation structures: mist chambers, poly house, shade net-houses, green houses, Raising of rootstocks and scion bank; Practicing propagation by cuttings and layering; Perform budding and grafting; Practicing on separation of plant parts used for propagation and repotting; Rejuvenation of plants by bridge grafting; Maintenance of mother plants; Explants selection and sterilization techniques; Stock solutions and culture media preparation; <i>In vitro</i> culturing; Acclimatization; Visit to commercial nurseries to experience the techniques and practices on mass scale planting material production; Visit to tissue culture laboratory and green houses where students will experience hands on training on micropropagation techniques</p>			
Teaching and Learning Methods	Interactive lectures, tutorials, laboratory works, group discussion, group presentations, field practical, field visits and independent learning			
Evaluation	Theory (67 %)		Practical (33 %)	
	Formative assessment (30%)	Summative assessment (70%)	Formative assessment (30%)	Summative Assessment (70%)
	Quiz - 10 % In-Class Test -15 % Assignments/ presentation - 5 %	Two hours Four out of five questions	Field practical records - 20 % Field visit reports -10 %	Practical exam - 20 % Spot - 30 % Oral - 10 %
Recommended Readings	<ol style="list-style-type: none"> 1. Alan Toogood (2019). Propagating plants. How to create new plants for free, DK Publishing 2. DueepJyot Singh and John Davidson (2015). Introduction to Plant Propagation - The Essential Guide to Plant Propagation Methods and Techniques Paperback 3. Lewis, W.J, and Alexander, D.Mc.E (2008). Grafting and Budding: A Practical Guide for Fruit and Nut Plants and Ornamentals. 2nd ed. Landlinks Press 4. Ray, R.K. (2012). Plant Nursery Management: How to Start and Operate a Plant Nursery, Scientific Publishers, India. 5. Eeswara, J.P. (2010). Plant Tissue Culture. Department of Crop Science, Faculty of Agriculture, University of Peradeniya. Ray, P.K (2009) <i>Plant Nursery Management: How to start and operate a plant nursery</i>. Scientific Publishers, India 6. Roberto Benech-Arnold and RodolfoSanchez (2008). <i>Handbook of Seed Physiology Applications to Agriculture</i>.CRC Press 			

	<p>7. Sergio Ruffo Roberto (2020). <i>Innovation in Propagation of Fruit, Vegetable and Ornamental Plants</i>. Horticulturae</p> <p>8. Peter Henderson (2011). <i>Propagation of Plants by Cuttings, Layers, Division, and Seed - With Information on Propagation for the Home Gardener</i>. Browne Press</p>
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Course Title	Applied Animal Nutrition and Forage Production		
Course Code	AS 21012		
Credit Value	02		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	23	15	62
Objectives	Provide knowledge on principles of nutrition for application in feed analysis and diet formulation, basic concepts of pasture and fodder management under different agro- climatic zones and training on appropriate selection of suitable pasture and fodder for pasture conservation methods.		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Classify feed resources of animals according nutritive value and use. • Identify common feed ingredients • Describe feed ingredients and their physical and nutritional characteristics. • Identify the nutritional requirement of different stages of animals. • Describe role of nutrients in animal and related deficiencies. • Formulate rations for different stages of animals. • Identify suitable improved varieties of pasture and fodder for different agro climatic zones. • Plan pasture and fodder unit for ruminants • Evaluate the yield, quality and quantity of pasture and fodder. • Describe the conservation methods of pasture and fodder • Identify anti-nutritional factors and toxins present in ingredients and suggest methods to eliminate them 		
Detailed syllabus	<p>Theory</p> <p>Principles of animal nutrition; Nutritional requirement and ration formulation for ruminants and monogastrics; Anti-nutritional factors; Feed additives; Vitamins; Minerals; Partitioning of energy within an animal, digestibility determination ; Feed formulation and processing; Potential for pasture production in Sri Lanka: agronomic description, establishment and management of pasture and fodder, Role of legumes in</p>		

	<p>pasture production; Grazing management; Stocking rate and carrying capacity; Estimation of yield and quality of herbage; Conservation of pasture and fodder.</p> <p>Practical</p> <p>Identification of feedstuff; Proximate analysis of feedstuff; Ration formulation for monogastrics and ruminants; visit to local and commercial farms to study different feed formulation methods, Classification of pasture and fodder; Establishment of pasture and fodder; Establishment of pure and mixed stand; Yield determination; Silage making; Hay making; Straw treatment and making of mineral block</p>			
Teaching and Learning Methods / Activities	Interactive lectures, paired learning, practical, tutorials, group discussion, field visits and assignments			
Evaluation	Theory (67%)		Practical (33%)	
	Formative Assessment (30%)	Summative Assessment (70%)	Formative Assessment (30%)	Summative Assessment (70%)
	Quiz- 10% In Class Test- 15% Presentation, (Proposal) and Assignment -5%	Two hours Four out of five questions	Laboratory practical reports - 10% Field trip reports -10% Field assignments-10%	Practical Exam-30% Spot exam - 30% Oral -10%
Recommended Readings	<ol style="list-style-type: none"> Liam Edberg (2016). Basic animal nutrition and feeding. New York: Arcler Press. Rao, R. (2020). Animal nutrition and feed technology. New Delhi: New India Publishing Agency. Hedayetullah M.D. and Zaman, P. (2021). Forage crops of the world. Volume II, Minor forage crops. Toronto: Apple Academic Press. Das, N. and Misra, A.K. (2015). Forage for sustainable livestock production. New Delhi: Satish Serial Pub. House Kellems, R.O and Church, D.C. (2010) Livestock feeds and feeding.6th Edition. Pearson publication. Thomas, C.G. (2003) Forage Crop Production in the Tropics. Kalyani Publishers, India. Raymond, F and Waltham, R. (2010) Forage conservation and feeding. 5th Edition. Diamond Farm book publishers. 			

Course Title	Economic Entomology		
Course Code	AB 21012		
Credit Value	02		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	15	30	55
Objective/s	Acquire knowledge and skills on the economic importance, identification, classification, anatomical modifications and physiological adaptations of insects for the successful survival in diversified eco-systems for its management, and commercial use.		
Intended Learning Outcomes	<ul style="list-style-type: none"> ● Explain various economic importance of insects ● Identify the morphological variations present in insects ● Illustrate the morphological variations found in different insects' groups ● Sketch the anatomy of different insect's body parts ● Describe the physiological adaptations found in insects to live in any habitat. ● Classify the insects in-to different taxonomy using morphological variations ● Demonstrate the role of social insects in the agro-ecosystem ● Apply acquired knowledge and skills in designing robotic system for various agricultural applications 		
Detailed syllabus	<p>Theory</p> <p>Economic importance of insects; Diagnostic features of Arthropoda and Class Insecta; External morphology of insect head, thorax and abdomen; Head appendages and its modifications; Thoracic appendages and its modification; Growth and development of insects; Internal anatomy of insects such as Digestive system; Reproductive system; Respiratory system; Nervous system; Apiculture and Sericulture; Insect as biocontrol agents.</p> <p>Practical</p> <p>Insect collection and preservation; External features of cockroach/grass hopper; Insect's antennae and their modifications; Mouthparts and their modifications; Microscopic and morphometric examination of modification of legs and wings of insects; Study on important insect orders: Thysanura, Neuroptera, Odonata, Orthoptera, Phasmida, Dermaptera and Dictyoptera, Coleoptera, Hemiptera, Lepidoptera,</p>		

	Isoptera, Diptera and Hymenoptera and their role in agroecosystem; Digestive, circulatory, reproductive and nervous system of insects; Apiculture; Bee keeping appliances and bee box; Field visit to study the habitats of insects and Sericulture.			
Teaching and Learning Methods / Activities	Interactive lectures, Group discussion, Assignments, Laboratory practical, field practical			
Evaluation	Theory (67%)		Practical (33%)	
	Formative Assessment (30%)	Summative Assessment (70%)	Formative Assessment (30%)	Summative Assessment (70%)
	Quiz - 10% In Class Test - 15% Presentations & assignments- 5%	Two hours Four out of five questions	Lab practical records -20% Insect collection reports -10%	Practical exam-30% Spot -30% Oral - 10%
Recommended Readings	<ol style="list-style-type: none"> 1. Beutel, Rolf G., Friedrich, Frank, Yang, Xing-Ke and Ge, Si-Qin (2014). Insect Morphology and Phylogeny: A textbook for students of entomology, Berlin, Boston: De Gruyter. 2. Chapman, R.F. (1998). The insects: Structure and functions. Hong Kong Colora flt Ltd. 3. Stephe Rere. (1999). Introduction to Bee keeping. Vikas publishing house Pvt ltd., New Delhi. 4. Krishnaswamy, R. (2000). Silkworm is a beneficial insect. Kalyani publications, New Delhi. 5. Snodgrass, R.E. and Eickwort, G.C. (1993). Principles of Insect Morphology. Cornell University Press, London 6. Gibb, T.G., Oesto, C. (2019). Insect Collection and Identification: Techniques for the Field and Laboratory. Elsevier Science. 7. Upton, M.S, Mantle, E.L, Beth L. Mantle (2010). Methods for Collecting, Preserving and Studying Insects and Other Terrestrial Arthropods. 5thEdition, Australian Entomological Society. 			

Course Title	Biochemistry			
Course Code	FS 21012			
Credit Value	02			
Core/Elective	Core			
Prerequisite	None			
Notional hours	Theory	Practical	Independent learning	
	20	20	60	
Objective/s	Provide basic knowledge of structure, function and characteristics of the basic biomolecules, and catabolic and anabolic pathways in the living cells and related analytical skills			
Intended Learning Outcomes	<ul style="list-style-type: none"> ● Classify the carbohydrates, proteins and lipids into different groups ● Compare different groups of carbohydrates, proteins and lipids based on their structure, function and characteristics ● Explain the characteristics and kinetic properties of enzymes ● Describe the functions of essential vitamins and minerals and their food sources ● Discuss the metabolism of biomolecules in the living cells ● Analyze the properties of basic biomolecules ● Interpret analytical results of biomolecules 			
Detailed syllabus	<p>Theory</p> <p>Carbohydrates: chemistry, classification, identification, properties and metabolisms; Amino acids and proteins: chemistry, classification, identification, properties and metabolisms; Fatty acids and lipids: chemistry, classification, identification, properties and metabolisms; Enzymes: characteristics and kinetic properties; Chemistry of nucleic acids; Essential vitamins and minerals: types, functions and sources.</p> <p>Practical</p> <p>Qualitative and quantitative tests for carbohydrates, amino acids, and proteins; Qualitative tests for lipids; Chemical constants of lipids: acid value, iodine value and saponification number; Qualitative and quantitative examination of milk components: fat, casein, lactose, lactalbumin, and calcium.</p>			
Teaching and Learning Methods / Activities	Interactive lectures, tutorial discussions, group discussions, group presentations, laboratory practical sessions, assignments			
Evaluation	Theory (67%)		Practical (33%)	
	Formative assessment (30%)	Summative assessment (70%)	Formative assessment (30%)	Summative assessment (70%)

	Quiz- 10% In Class Test-15% Assignment -5%	Two hours Four out of five questions	Practical records -20% Assignments – 10%	Practical exam- 40% Spot - 20% Oral - 10%
Recommended Readings	<ol style="list-style-type: none"> 1. Nelson, D. L. and Cox, M. (2017). Lehninger Principles of Biochemistry, 7th ed. Macmillan Learning Publisher. 2. Rodwell, V.W., Bender, D.A., Botham, K.M., Kennely, P.J., and Weil, P.A. (2018). Harper's illustrated biochemistry, 31st ed., McGraw-Hill education, New York. 3. Jain, J.L., Jain.S and Jain,N (2016). Fundamentals of Biochemistry, 7th ed., S. Chand and Co., New Delhi. 4. Hames, D. and Hooper, N. (2005). Biochemistry, 3rd ed.. New York: Taylor & Francis Group 5. Deb, A.C. (2008). Fundamentals of biochemistry, 9th ed. New Central Books Agency (P) Ltd, Kolkata. 			

Course Title:	Water Resource Engineering		
Course Code:	AE 21013		
Credit Value:	03		
Core/ Optional	Core		
Prerequisite	None		
Notional Hours	Theory	Practical	Independent learning
	30	30	90
Objectives	Provide better knowledge and practical skills in groundwater resources, hydrostatics and hydrodynamics for the effective use of water resources.		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Select irrigation structures for efficient water management. • Explain the water management applications in the field of agriculture. • Discuss the strategies needed for groundwater conservation. • Calculate aspects related to irrigation hydraulics. • Develop a comprehensive system for the stability of irrigation structures. 		
Detailed Syllabus	Theory Groundwater; Confined and unconfined aquifer; Quality of surface and groundwater; Water demand; Groundwater classification of Sri Lanka; Effects of poor drainage; Composite hydraulic conductivity; Seepage losses; Leaching requirements; Design of drainage: drainage spacing, drainage investigation, drainage materials and axillaries; Operation and maintenance of drainages systems; Field dynamics and channel flow; Introduction to open channel flow; Chezy's formula for discharge;		

	<p>Channel of most economical cross section; Manning's formula for discharge; Discharge through rectangular and circular channels; Conditions for maximum discharge; Design for pen channels; Hydrostatics; Centroid and second movement of area; Pressure diagram; Centre of pressure; Water pressure on sluice gate and dam; Hydrodynamics; Energy of liquid in motion; Bernoulli's theorem; Uniform flow through open channels; Pumps for water lifting.</p> <p>Practical Pumping test: recuperation test, thesis well function test; Water quality of groundwater; Dry sieve analysis for drainage filling materials; Selection of filling materials; Design of drainage spacing; Flow measurement in V-notch; Installation of partial flume: measurement of flow in partial flume; Structural verification of dam sluice and spillway; Types of pumps; Mantling and dismantling of water pump; Monitoring of ground water pollution.</p>			
Teaching and learning methods/ Activities	Lectures, Tutorials, Group assignment, Group discussion, Practical demonstrations.			
Evaluation	Theory (67%)		Practical (33%)	
	Formative Assessment (30%)	Summative Assessment (70%)	Formative Assessment (30%)	Summative Assessment (70%)
	Quiz - 10% In Class Test - 15% Assignment/ Presentation - 5%	Three hours Five out of six questions	Practical records/ Assignments - 20% Field visit reports - 10 %	Practical exam - 30% Spot - 30% Oral - 10%
Recommended Readings	<ol style="list-style-type: none"> 1. Agarval, V.C., (2012). Groundwater hydrology. PHI learning private limited, New Delhi. 2. Tanji, K.K., (2012). Agricultural Salinity Assessment and Management, Scientific Publishers. 3. Fränzle, S., Markert, B., Wünschmann, S., (2012). Introduction to Environmental Engineering. John Wiley & Sons. 4. Ghanshyam, D., (2000). Hydrology and Soil Conservation. Prentice Hall of India 5. Patra, K.C., (2008). Hydrology and Water Resources Engineering, Alpha Science. Alpha Science International. 6. Wanielista, M.P., (1990). Hydrology and water quality control. John Wiley and sons New York. 			

Course Title	Intermediate Microeconomics		
Course Code	EC 21012		
Credit Value	02		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	30		70
Objective/s	Enhance the microeconomic knowledge of students and their techniques of economic analysis by applying the combination of economic theory, diagrams and mathematical concepts		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Explain the fundamentals of microeconomic theory. • Apply a core set of microeconomic concepts useful in analysing supply, demand, market, and policy issues. • Apply algebraic and calculus tools to analyse microeconomic issues. • Analyse the effects of alternative policy tools on market outcomes. • Interpret the results of economic analysis in a clear and professional way. 		
Detailed syllabus	<p>Theory Market: optimization and equilibrium, pareto efficiency; Budgetary and other constraints; Preferences: assumption about preferences, indifference curves, marginal rate of substitution; Utility: utility function, marginal utility and MRS; Choice: optimal choice, concave preferences; Demand: substitutes and complements, inverse demand; Slutsky equation: substitution and income effect, compensated demand curves; Consumer surplus: change in consumer surplus, compensating and equivalent variations; Producer surplus; Market equilibrium: comparative statics, deadweight loss of tax; Technology: constraints, marginal product, technical rate of substitution, long run and short run, returns to scale; Profit maximization: short and long run profit maximization, inverse factor demand curves; Cost minimization: long and short-run costs; Cost curves; Pure competition: firm short and long run supply, industry short, long run supply and equilibrium; Monopoly: causes of monopoly, inefficiency and dead weight loss; Monopoly behavior: first, second and third-degree price discrimination; Monopolistic competition: product differentiation; Oligopoly: price and quantity leadership, cournot equilibrium, collusion;</p>		
Teaching and Learning Methods / Activities	Interactive lectures, tutorials and group assignments		
Evaluation	Theory		
	Formative Assessment	Summative Assessment	

	(30%)	(70%)
	Quiz- 10% In Class Test – 15% Assignment/ Presentation -5%	Three hours 25 MCQ and Four essay questions out of five questions
Recommended Readings	<ol style="list-style-type: none"> 1. Hal R. Varian. (2006). Intermediate Microeconomics A modern Approach, seventh edition, W.W. Norton & Company, New York. 2. Robert S. Pindyck and Daniel L. Rubinfeld. (2013). Microeconomics, eighth edition, Prentice Hall 	

Course Title	Social Harmony and Active Citizens	
Course Code	AC 21011	
Credit Value	01	
Core/Elective	Core	
Prerequisite	None	
Notional hours	Practical	
	Activity-based learning	Social action project
	20	30
Objective/s	Improve the social responsibility of students to act on their community needs whilst giving them the knowledge, skills, experience, and networks to address the needs.	
Intended Learning Outcomes	<ul style="list-style-type: none"> • Identify own cultural traits • Construct ideas about how their local community works and its links to the rest of the world • Make use of the knowledge to improve society through sustainable initiatives • Show the ability to work effectively with a diverse group of people • Establish skills in cross-cultural communication required in community action • Execute projects to address the local and global issues 	
Detailed syllabus	Understanding culture and people: multiculturalism, self-identification and the factors that shape the identity, Dialogues and interpersonal communication: types and the importance of dialogue, differences between dialogue and debate, active listening, gender relationship, gender equity and equality, dignity and values, acceptance of global and national pluralism; Society and me: decision making and power structure, skills required to work with the community amid the differences in power; identification of issues relating to social disharmony, conflict and conflict resolution mechanism, mediation, negotiation; Social action project: project planning and implementation.	
Teaching and Learning Methods / Activities	Interactive non-formal learning, group discussions, storytelling, games, activities, field visits, role-play, audio-visual aids, guest lectures, social	

	activities, action projects, interviews, peer discussions, group presentations		
Evaluation	Practical (100%)		
	Learning journey (30%)	Project (70%)	
	Self and peer evaluation (By evaluating the successful completion of group tasks/ activities)	Proposal presentation (30%)	Final project presentation and report (70%)
Recommended Readings	<ol style="list-style-type: none"> 1. British Council, (2021). Active Citizens Facilitator’s Toolkit. 2. British Council, (2020). Active Citizens: Social Action for Climate Change. Delivery Notes for Facilitators. Version 1.0. 3. British Council, (2020). Active Citizens Toolkit for Digital & Blended Methodologies For Delivering Active Citizens From Distance. 4. British Council, (2014). Active Citizens Facilitator’s Toolkit. v4. 5. The Ministry of Higher Education, The Democratic Socialist Republic of Sri Lanka, Manual for the Social Harmony and conflict resolution. 		

Second Year Second Semester - Core Courses (22000)

Course Title	Horticulture I		
Course Code	AG 22012		
Credit value	02		
Core / Elective	Core course		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	20	20	60
Objectives:	Furnish students with the knowledge and skills on propagation techniques, field planting, common and special agronomic practices, cultivation under protected structures and the effects of environmental factors on growth and development of horticultural crops especially vegetables and floricultural crops		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Recall the importance of vegetable and floriculture industries to the national economy • Classify major vegetable and floricultural crops 		

	<ul style="list-style-type: none"> • Illustrate the climate and soil requirements for different vegetables and cut flowers • Demonstrate nursery management and propagation techniques for vegetables, cut flowers, and other ornamentals • Discuss the common and special agronomic practices to improve the productivity of vegetable and floriculture crops • Justify the significance of growing vegetable and floricultural crops under protected structures • Propose suitable methods to cultivate off-season vegetables and cut flowers • Elaborate the importance of marketing, trade and institutional support for the vegetable and floriculture industry
<p>Detailed Syllabus / Course Content</p>	<p>Theory</p> <p>Importance of horticultural crop production especially vegetables and floricultural crops; Types of vegetables; Varieties; Field establishment; Common and special agronomic practices adopted to improve the productivity; Influence of environmental factors on productivity; Harvesting; Grading and storage; Opportunities and challenges for the floriculture industry in Sri Lanka; Types of cut flower and greeneries; Propagation and cultivation techniques; Export qualities flowers and greeneries; Bonsai techniques, terrarium and miniature garden; Different protected structures used for vegetables and floricultural crops; Special practices adopted in protected cultivation; Indoor and urban gardening.</p> <p>Practical</p> <p>Identification of local and exotic vegetable crops; Field establishment of different vegetable crops by direct sowing; Nursery establishment and transplanting; Maintenance of crop plot by adopting common and special agronomic practices; Observation of growth stages of different vegetable crops; Classification of vegetable crops using their phenological characters: seeds, leaves, flower colours, fruits etc; Assessment of the suitability of different protected structures; Cultivation of high value crops using hydroponic techniques; Identification of different cut flower species, loose flowers, cut foliage, potted plants, rooted and un-rooted cuttings; Common propagation techniques of different floricultural crops; Establishment of floricultural crops in field/ under protected structures; Value addition of floricultural products/ byproducts using different techniques: chilling, drying, dehydration; Fresh/ dry flower arrangements; Preparation of bonsai plant, terrarium and miniature garden; Visit to small, medium and commercial scale vegetable and floricultural farms to experience the hands-on practices and study the real world problems.</p>

Teaching and learning methods	Interactive lectures, tutorials, laboratory works, demonstration, group assignment and discussion, field practical, and field visits			
Evaluation	Theory (67%)		Practical (33%)	
	Formative assessment (30%)	Summative Assessment (70%)	Formative assessment (30%)	Summative Assessment (70%)
	Quiz- 10% In Class Test -15% Assignment/Presentation -5%	Two hours Four out of five questions	Field practical records - 20 % Field visit reports - 10 %	Practical exam - 20 % Spot - 30 % Oral - 20 %
Recommended readings:	<ol style="list-style-type: none"> 1. Adams, C. R. (2012). Principles of Horticulture. Routledge, USA. 2. Dole, J.M. (2005) Floriculture; Principles and species. 2nd edition. Pearson education, New Jersey. 3. Gregory E Welbaum (2015). <i>Vegetable Production and Practices</i>. Virginia Tech University, USA. 4. Jitendra Singh. (2003) Basic Horticulture. Kalyani publication, Ludhiana. 5. Kumar. U and Prasad. S(2010). <i>A Handbook of Floriculture</i>. Agrobios (India).ISBN 10: 8177544098 / ISBN 13: 9788177544091 6. Padmini, S. M. P. C. and Kodagoda, T. D. (2017) Present status and future scope of floriculture industry in Sri Lanka and its potential in women empowerment Sri Lanka. Journal of Social Sciences. 40 (1): 31-40 7. Pranab Hazra A. Chattopadhyay (2011). <i>Modern Technology in Vegetable Production</i>. Zaccheus Entertainment. ISBN 978-9380235325 8. Rana, M. K. (Ed.). (2017). Vegetable crop science. CRC Press. 9. Ranil, R.H.G., Pushpakumara, G., Fonseka, R.M., Fonseka, H., Bandaranayake, P.C.G., Weerakkody, W.A.P., Ariyaratne, W.M.T.P., De Silva, A.N. and Gunawardena, N.P.T. (2020). Utilizing neglected crop genetic resources for food and nutritional security: special reference to indigenous vegetables of Sri Lanka. Agricultural Research for Sustainable Food Systems in Sri Lanka (pp. 39-66). Springer, Singapore. 10. Weerakkody, W. A. P. and Mawalagedera, S. M. M. R. (2020) Recent Developments in Vegetable Production Technologies in Sri Lanka in Buddhi Marambe, Jeevika Weerahewa, Warshi S. Dandeniya. Agricultural Research for Sustainable Food Systems in Sri Lanka: A Historical Perspective, pp. 189-214 			

Course Title	Principles of Forestry		
Course Code	AG 22022		
Credit Value	02		
Core/Elective	Core course		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	23	15	62
Objectives	Provide the knowledge and skills on forest ecosystems, biological, physical, ecological and socio-cultural aspects of forestry in contribution for the sustainable forest management, causes for degradation of forests and significance of reforestation		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Recall the ecological principles of forestry • Classify the major forest types in the world and Sri Lanka • Distinguish natural and manmade forests • Elaborate the biological, physical and socio-cultural aspects of forestry • Demonstrate the different forest measurements and their significance in assessment of forest ecosystems • Describe the role of forest in ecosystem stability and biodiversity • Appraise the causes of forest degradation and deforestation • Describe the policies and legislation for forest conservation in Sri Lanka • Develop sustainable forest management plan proposing suitable species and other management practices 		
Detailed syllabus	<p>Theory Ecological succession; Ecology of forest/woodland; Global classification of forest; Classification of forest types in Sri Lanka; Characteristics of major forest types in Sri Lanka, Role of forest; Forest products ecosystem services of forest and biodiversity; Forest biology, forest structure, physical, and socio-cultural aspects of forestry; Ecosystem interactions, biomass and carbon sequestration in forestry; Plantation forestry and natural forest management; Forest resources for sustainable land use management; Causes of forest degradation; Deforestation, afforestation and reforestation; Policies and legislation for forest conservation.</p> <p>Practical Identification of common tree species in different forests and determination of dominant species; Preparation of plant press and herbarium; Identification of tools used for forest assessments; Taking different measurements of forest and estimate carbon stock and carbon sequestration; Study the biodiversity of forestry; Assessment of</p>		

	ecological interactions in forestry systems using different forest measurements; Field visit to different types of forest systems in Sri Lanka to study the site specific characters of different forest systems and provide opportunity to students to practice hands-on skills in obtaining forest measurements and to experience the different problems associated with forest ecosystems.			
Teaching and Learning Methods	Interactive lectures, tutorials, laboratory works, demonstration, group assignments, video clips, field practical and field visits			
Evaluation	Theory (75 %)		Practical (25 %)	
	Formative assessment (30%)	Summative Assessment (70%)	Formative assessment (40%)	Summative Assessment (60%)
	Quiz- 10% In Class Test – 15% Assignment/ Presentation - 5%	Two hours Four out of five questions	Practical record - 20% Field visit report - 20 %	Practical exam - 30 % Spot - 20 % Oral - 10 %
Recommended Readings	<ol style="list-style-type: none"> 1. Grebner, D. L., Bettinger, P., Siry, J., and Boston, K. (2021). Introduction to forestry and natural resources. 2nd Edition. Academic press. 2. Lewark, S.(2022). Work in Tropical Forests, Springer Berlin, Heidelberg. 3. Bettinger, P., Boston, K., Siry, J., and Grebner, D. L. (2016). Forest Management and Planning. 2nd Edition, Academic press. 4. Waring, R. H. and Running, S. W. (2010). Forest ecosystems: analysis at multiple scales. Elsevier. 5. West, P. W. and West, P. W. (2009). Tree and Forest Measurement (Vol. 20). Berlin: Springer. 6. James W. Hardin., Donald J. Leopold and Fred M. White.(2000). <i>Harlow and Harrar's Textbook of Dendrology 9th Edition</i>. McGraw-Hill. ISBN-13 : 978-0073661711 7. Ken Mudge and Steve Gabriel (2014). <i>Farming the Woods: An Integrated Permaculture Approach to Growing Food and Medicinals in Temperate Forests</i>. Chelsea Green Publishing; Illustrated edition. ISBN-13- 978-1603585071 8. Burton V. Barnes., Donald R. Zak., Shirley R. Denton and Stephen H. Spurr (1998). <i>Forest Ecology 4th Edition</i>. Wiley, ISBN-10: 9781402049484 /ISBN-13: 9789048172375 9. Nanayakkara V. R (1996) <i>Forests and Forestry in Sri Lanka</i>. Common wealth Secretariat ISBN-10: 085092488X/ ISBN-13: 978-0850924886 10. Mark shepard (2013). <i>Restoration Agriculture</i> 1st Edition. Acres U.S.A. ISBN-10:1601730357 			

Course Title	Livestock Breeding and Health Management		
Course Code	AS 22012		
Credit Value	02		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	23	15	62
Objectives	Impart the basic principles of quantitative genetics; concepts of selection and breeding methods and the use of important reproductive technologies to increase the reproductive efficiency in farm animals, Livestock and poultry diseases, identifying, diagnosing the diseases and controlling management strategies.		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Distinguish qualitative and quantitative traits the basic principles of quantitative genetics • Describe the selection aids and selection methods • Discuss different breeding methods • Discuss the factors influencing response to selection • Discuss appropriate reproductive technology to increase reproductive efficiency in farm animals. • Diagnose major livestock diseases • Describe the pathology of diseases • Describe gross abnormalities and histological changes of diseases • Recommend control strategies for various diseases 		
Detailed syllabus	<p>Theory Quantitative Vs. qualitative traits: Hardy Weinberg Law, gene and genotypic frequency, forces changing gene frequency, random drift and small populations; Selection: selection aids, and response to selection; Theory of path coefficient; Inbreeding: methods of estimating inbreeding coefficient, systems of inbreeding; Effective population size; Breeding value: estimation of breeding value, dominance and epistatic deviation; Partitioning of variation; Genotype X environment correlation and genotype X environment interaction; Role of multiple measurements; Resemblance between relatives; Artificial insemination and embryo transfer; National Livestock Breeding Policy; Livestock and Poultry diseases of major importance; Principles of disease recognition; Control and prevention of bacterial, viral, protozoan and fungal diseases; Internal and external parasites and their control.</p> <p>Practical Examine the pathological slides; Identifying livestock and poultry diseases; Postmortem examination of carcass; Mendelian genetics; Population genetics; Estimation of breeding value; Semen collection,</p>		

	processing, evaluation and insemination; demonstration of embryo transfer.			
Teaching and Learning Methods / Activities	Interactive lectures, practical, tutorials, group discussion, paired learning, field visits and assignments			
Evaluation	Theory (75%)		Practical (25%)	
	Formative Assessment (30%)	Summative Assessment (70%)	Formative Assessment (30%)	Summative Assessment (70%)
	Quiz- 10% In Class Test- 15% Presentation, (Proposal) and Assignment -5%	Two hours Four out of five questions	Laboratory practical reports - 10% Field trip reports - 10% Field assignments- 10%	Practical exam - 30% Spot exam - 30% Oral - 10%
Recommended Readings	<ol style="list-style-type: none"> 1. Kadarmideen, H.N. (2016). Systems Biology in Animal Production and Health, Vol. 1. Cham Springer International Publishing. 2. Loly, S. and Hopkinson, H. (2022). Large animal medicine for veterinary technicians. Hoboken, Nj: Wiley-Blackwell. 3. Thomas, H.S. (2009) The Cattle Health Handbook. 1st Edition. Storey Publishing, LLC. 4. Radostits. (2007) Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 10th Edition. Saunders Ltd. 5. Hassey, C. (2015). Livestock production : genetics, breeding and management. New York: Callisto Reference 6. Bourdon, R.M. (1997) Understanding Animal Breeding. Prentice Hall, USA. 7. Falconer, D.S. and Mackay, F.C. (1996) Introduction to Quantitative Genetics. 4th Edition. Longman, London. 			

Course Title	Ruminant management		
Course Code	AS 22023		
Credit Value	03		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	23	45	82

Objective/s	Provide knowledge, skills and the strategies involved in proper management of different stages of animals towards efficient production.			
Intended Learning Outcomes	<ul style="list-style-type: none"> • Describes the standard procedures for the different management practices of the ruminants at commercial level in Sri Lanka. • Demonstrate the techniques used in the breeding and herd management of ruminants for optimum production. • Identify factors affecting dairy production, product quality and quantity • Interpret the relationship of factors to the processes of product optimization. • Propose a plan for ruminant farm and management strategies for optimum resource utilization and improvement of business. • Estimate feeding requirements for optimum production in an identified farm size. • Evaluate performance of commercial cattle and goat farms to identify problems and suggest improvements. • Discuss the policy implementations for dairy sector in Sri Lanka towards self-sufficiency. 			
Detailed syllabus	<p>Theory Introduction to breeds of ruminants; System of management; Routine management practices: types of housing; Management of cattle and buffalo: new born calf weaning, calf management, selection of animals for breeding, heifer management and breeding, pregnant and lactating cow management; Milking techniques; Dry cow management; Calving, Stud bull management; Draught animal management; Goat and sheep management; Production and reproduction performance of farm animals; Farm records and planning; Interpretation of production/reproduction data.</p> <p>Practical Identification of ruminant breeds; Farm assignments, management of records for ruminants; Restraining and handling of farm animals; Feeds and feeding methods; Housing; Use of farm equipment and measurement of physical and physiological parameters, Herd composition of ruminants. Herd management; techniques used in determining age, identification, estimation of body weight; body condition scoring; milking.</p>			
Teaching and Learning Methods / Activities	Interactive lectures, practical, tutorials, group learning, paired learning, field visits and assignments			
Evaluation	Theory (50%)		Practical (50%)	
	Formative Assessment (30%)	Summative Assessment (70%)	Formative Assessment (30%)	Summative Assessment (70%)
	Quiz- 10% In Class Test– 15% Assignment/ Presentation -5%	Two hours Four out of five questions	Field practical records – 20%	Practical exam - 30% Spot - 30% Oral -10%

			Field visit reports – 10%	
Recommended Readings	<ol style="list-style-type: none"> 1. Squires, V.R. and Bryden, W.L. (2019). Livestock : production, management strategies and challenges. New York: Nova Science Publishers. 2. Pramod Kumar Rout (2022). Sustainability In Ruminant Livestock : management and marketing. S.L.: Springer. 3. Sahoo, A. (2012). Trends in small ruminant production : perspectives and prospects. Delhi: Satish Serial Pub. House 4. Kellems, R.O. (2009). Livestock feeds and feeding. 6th Edition. Prentice hall. 5. Thomas, H. S. (2008). Essential guide to calving; giving your beef or dairy herd a healthy Start. Storey publishing, LLC. 6. Abeyratne, A.S. (2007). A review of the livestock industry in Sri Lanka. 1st edition. 7. Thomas, H. S. (2005). Getting started with beef & dairy cattle. Storey publishing, LLC. 8. Ekarius, C. (2004). How to build animal housing; 60 plans for coops, hutches, barns, sheds, pens, nest boxes, feeders, stanchions, and much more. Storey publishing, LLC. 			

Course Title	Basic Microbiology and Phytopathology		
Course Code	AB 22012		
Credit Value	02		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	15	30	55
Objective/s	Impart knowledge and skills on the different group of microbes, their role in different ecosystems and application in various industries, principles of disease development in crops, factors influencing plant disease epidemics and principles of plant disease management.		
Intended Learning Outcomes	<ul style="list-style-type: none"> ● Recall the different groups of microorganisms ● Describe the basic characteristics of the different microbes ● List out the importance of the microbes to Agriculture ● Apply different techniques to isolate plant pathogens from specimens ● Illustrate the different reproductive structures of plant pathogens ● Choose appropriate instruments to culture plant pathogens 		

	<ul style="list-style-type: none"> ● Measure disease incidences and severity in the field scenario. ● Apply diverse techniques to manage plant diseases 			
Detailed syllabus	<p>Theory Microbes and their classification (fungi, bacteria and virus); Microbial interaction – [Symbiosis, Antagonistic and Pathogenic] and their role in agriculture; Beneficial microorganisms: biofertilizers, edible mushrooms; Effective Microorganism (EM), microbial industrial technologies; Stages in the development of plant disease; Pathogen attack on plants; Chemical weapons of plant pathogens; Effect of pathogens on plant physiological functions; Defense mechanism of plants against pathogens; Disease assessment; Role of environment on the development of plant disease and pathogens; Conventional and molecular methods in disease detection and diagnosis; Management of plant diseases.</p> <p>Practical Koch’s postulates; Isolation, culturing and purification of specific microbes; Identification of microbes; Preservation of microbial cultures; Use of different media and structures used to understand different microbes; Nitrogen fixers and other symbiotic antagonistic microorganisms: cultures, production and their application in agriculture; Field study on pathogenic and beneficial microorganisms; Collection and preservation of specimens from different ecosystem including farmer’s fields; Mass production of bio-fertilizers; Mushroom and its production constrains, potential and usage; Disease symptoms and their identification on plants; Visual scoring of plant diseases; Field visit to identify plant diseases; Cross protection technique; Preparation of Bordeaux mixture and Bordeaux paste.</p>			
Teaching and Learning Methods / Activities	Interactive Lectures, group discussion, assignments, laboratory practical, field practical			
Evaluation	Theory (67%)		Practical (33%)	
	Formative Assessment (30%)	Summative Assessment (70%)	Formative Assessment (30%)	Summative Assessment (70%)
	Quiz- 10% In Class Test– 15% Assignments -5%	Two hours Four out of five questions	practical records -20% Herbarium collections - 10%	Practical Exam-30% Spot -30% Oral - 10%
Recommended Readings	<ol style="list-style-type: none"> 1. Nirri (2004). The complete technology book on biofertilizer and organic farming, National institute of industrial research, Dhelli 2. Biswas, P.K. (2008). Agricultural microbiology, Dominant Publishers 3. Eldor A. Paul (2007). Soil Microbiology, Ecology and Biochemistry, Academic Press 			

	<p>4. Agrios. G. N. (2004). Plant pathology. 5th edition. Academic press</p> <p>5. Singh, K. (1998). Principles of plant pathology. Kalyani publications, New Delhi.</p> <p>6. Dubey, and Mageswary, (1999). Text book of microbiology. Kalyani publications, New Delhi.</p> <p>7. Lee, D.L. (2002). The Biology of Nematodes. APS press.</p> <p>8. Narayanasamy, P. (2001). Plant Pathogen Detection and Disease Diagnosis. Marcel Dekker.</p>
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Course Title	Principles of Food Science and Nutrition		
Course Code	FS 22013		
Credit Value	03		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	30	30	90
Objective/s	Provide knowledge on suitability of raw materials and quality of finished foods and regulatory systems to ensure the quality and safety of the foods, nutritional needs and nutrition related diseases in human and required analytical skills in these aspects		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Identify different food regulatory systems for food processing industries • Describe the mechanisms of browning reactions and autoxidation of different foods • Explain the suitability of different raw materials for food processing • Compare nutritional composition of different groups of foods • Categorize the changes in food qualities during different processing treatments and the ways to enhance the quality of products • Analyze the proximate composition of foods • Develop the food security concept in national and global level • Discuss the dietary requirements for different age groups • Correlate the nutrition related diseases in human 		
Detailed syllabus	<p>Theory</p> <p>Functions of food; Composition and nutritional aspects of foods of plant and animal origin; Quality of raw materials for food processing; Quality factors in foods; Food systems; Unit operation in food processing; Effect of processing on functional and nutritional value of foods; Browning reactions; Autoxidation of fats; Plant and animal pigments and their changes during processing and storage; Food quality standards and regulatory systems in Sri Lanka; Nutrition for different stages of life cycles; Measurement of energy expenditure; Basal metabolic rate;</p>		

	Protein quality; Balanced diet; Malnutrition; Body mass index; Food fortification; Food security; Nutritional labeling.			
	<p>Practical Proximate analysis of foods: moisture, ash, crude fat, crude protein and crude fiber; Titratable acidity and ascorbic acid estimation of fruits; Total microbial count in cereals; Peroxide value of fat or oil; Prevention of enzymatic browning; BMI and BMR estimation.</p>			
Teaching and Learning Methods / Activities	Interactive lectures, tutorial discussions, group discussions, group presentations, laboratory practical sessions, assignments			
Evaluation	Theory (67%)		Practical (33%)	
	Formative assessment (30%)	Summative assessment (70%)	Formative assessment (30%)	Summative assessment (70%)
	Quiz- 10% In Class Test – 15% Assignment -5%	Three hours Five out of six questions	Practical records - 20% Assignments - 10%	Practical exam - 40% Spot Exam - 20% Oral - 10%
Recommended Readings	<ol style="list-style-type: none"> 1. Shewfelt,R.L., Orta-Ramirez.A and Clarke,A.D (2016). Introducing food science, 2nd edition, CRC Press, Boca Raton 2. Ward, J. D. and Ward, L. T. (2013). Principles of food science, 4th Ed. Good heart-Willcox company Inc., Illinois. 3. Potter, N. N. and Hotchkiss, J. H. (1995). Food Science, 5th Ed. Springer. 4. Srilakshmi,B (2016). Food Science, 7th Ed. New Age International Publisher, New Delhi 5. Srilakshmi,B (2014). Nutrition Science, 6th Ed. New Age International Publisher, New Delhi 6. Savage King, F., Burgess, A., Quinn, V. J. and Osei, A. K. (2015). Nutrition for developing countries, 3rd Ed. Oxford University press 7. Bender, D.A. (2008). Introduction to nutrition and metabolism, 4th edition, CRC Press, New York. 			

Course Title:	Land Surveying and Irrigation		
Course Code:	AE 22012		
Credit Value:	02		
Core/ Optional	Core		
Prerequisite	None		
Notional Hours	Theory	Practical	Independent learning
	21	21	58
Objectives	Provide technical knowledge and practical skills on concepts of surveying, levelling and irrigation for sustainable agricultural practices.		

Intended Learning Outcomes	<ul style="list-style-type: none"> • Demonstrate the application of surveying and levelling concepts in the field of agriculture. • Differentiate different surveying methods used for the measurement of an area. • Describe suitable irrigation methods for the efficient water use. • Estimate annual soil loss using recognized methods. • Discuss soil and water conservation measures. • Relate the importance of surveying measurements to landscaping and irrigation designs. 			
Detailed Syllabus	<p>Theory Coordinate geometry; Introduction to surveying and levelling; Basic principles of survey measurements; Levelling; Chain surveying; History of surveying; Horizontal and vertical distance measurement; Methods of booking; Applications of levelling; Checking the levelling data; Correction factors; Methods of measuring area: mid ordinate rules, average ordinate rules and Simpson’s rules; Volume measurement: cross section method; Measurement of horizontal distance: pacing, odometer, and electronic distance measurement, chain, tape, tachometry, systematic errors in linear measurements; Theodolites and their applications; Soil water relationship; Soil moisture and water potential; Water movement; Darcy’s law; Crop evapotranspiration; Consumptive use; Irrigation efficiency; Water application methods; Small irrigation structures; Soil conservation principles; Soil erosion and their types: soil erosion systems, soil erosion mechanism, soil erosion control measures and drainage system design; Universal soil loss equation; Classification of wind erosion; Soil conservation at farm level; Sediment transportation.</p> <p>Practical Demonstration of basic survey instruments; Land levelling: rise and fall method, height of collimation; Level book handling; Chain surveying; Plane table surveying: radiation methods, intersection methods, traverse method; Contour surveying: grid peg method; Contour map development; Compass surveying; Construction surveying; Introduction to AutoCAD: survey map development using AutoCAD; Differential levelling; Soil moisture measurement; Evaporation measurement; Crop evaporation measurement; Computer application of CROPWAT; Observation of small irrigation structures; Measurement of hydraulic conductivity by inverse auger hole method; Measurement of hydraulic conductivity by auger hole method; Measurement of soil erosion by water; Landscaping for irrigation using surveying.</p>			
Teaching and learning methods	Lectures, Tutorials, Group assignments, Field practical and Practical demonstrations.			
Evaluation	Theory (67 %)		Practical (33 %)	
	Formative Assessment (30%)	Summative Assessment (70%)	Formative Assessment (30%)	Summative Assessment (70%)
	Quiz - 10% In Class Test -15%	Two hours	Practical records/	Practical exam - 30%

	Assignment/ Presentation - 5%	Four out of five questions	Assignments - 20% Field visit reports - 10 %	Spot - 30% Oral - 10%
Recommended Readings	<ol style="list-style-type: none"> 1. Bredero, T.J., (1991). Crop water management research. Oxford and IBH publishing co.pvt.ltd. New Delhi. 2. Morgan, R.P.C., (2009). Soil Erosion and Conservation. John Wiley & Sons. 3. Hunter, T. et al., (2012). An Introduction to Engineering Surveying. Juta Academic Press 4. Lipschutz, M.M., (1999). Differential Geometry, Theory and Problems. University of Bridge port. 5. Roy, S.K., (2010). Fundamentals of Surveying. Phi Learning Pvt. Ltd. 6. Sankara Redid, G.H. and Yellamanda Reddy, T., (2003). Efficient use of irrigation water. Kalyani Publishers New Delhi. 			

Course Title	Agribusiness Management and Business Accounting		
Course Code	EC 22013		
Credit value	03		
Core / Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	30	30	90
Objectives/s:	Provide knowledge on key concepts of an agribusiness enterprise and the relationships between producers, processors, manufacturers and consumers and considerable experience in agro-industrialization.		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Explain the agribusiness organizations and the environment in which they operate • Explain the relevant concepts, theories and methods and their application to managerial problems in agribusiness • Describe how specific management techniques may be applied to agriculturally- related businesses • Explain the importance of research for profitable agribusiness • Discuss critical and pervasive issues relating to agribusiness management 		

Detailed Syllabus / Course Content	<p>Theory Introduction to Agribusiness management; Production function and the stages of production; Producer decision making: single variable input and two variable input functions, Decision making in an environment of risk and uncertainty; Principles of credit management; Farm investment analysis; Introduction to business accounting.</p> <p>Practical Preparation of Income statement; Preparation of Net worth statement; Estimating the credit need and repayment capacity of the farmer- A field assessment; Writing up the books of original entries; Calculation of depreciations; Doing the adjustments before final accounts; Preparing the final accounts.</p>				
Teaching and learning methods	Interactive lectures, tutorials, laboratory works, group presentation, group discussion, field practical, field visits and Problem based learning				
Evaluation	Theory (67%)		Practical (33%)		
	Formative assessment (30%)	Summative Assessment (70%)	Formative assessment (30%)	Summative Assessment (70%)	
	Quiz- 10% In Class Test -15% Assignment/ Presentation -5%	Three hours Five out of six questions	Field practical records - 20 % Field visit reports - 10 %	Practical exam- Oral-10 %	60%
Recommended readings	<ol style="list-style-type: none"> 1. Beierlein, J.G., Schneeberger, K.C. and Osburn, D.D. (2007). Principles of Agribusiness Management. Waveland Pr Inc. 2. Amarnath, J.S. and Samvel, A.P. (2008). Agri Business Management. Satish Serial Publishing House. 3. Cramer, G.L. Jensen, C.W. and Southgate, D.D. (2001). Agricultural Economics and Agribusiness. John Wiley & Sons, Inc. 4. Wood, F. and Sangster, A. (1999). Business Accounting 1. Pitman publishing. 5. Debertin, D.L. (1986). Agricultural Production Economics. Collier Macmillan publishers. 6. Barry, P. and Ellinger, P. (2011). Financial Management in Agriculture. Prentice Hall. 7. Wheeling, B.M. (2007). Introduction to Agricultural Accounting. Delmar Cengage Learning. 				

Course Title	Career Guidance and Skill Development		
Course Code	AC 22011		
Credit Value	01		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	00	30	20
Objective/s	Impart knowledge on the importance of career guidance, career counseling and develop skills to best fit into the career		
Intended Learning Outcomes	<ul style="list-style-type: none"> • Plan career and aiming career goals • Demonstrate how career guidance and skills could help in improving their career • Present skills in their personal and professional career 		
Detailed syllabus	<p>Practical</p> <p>Concept of career and the career expectation and available opportunities; Types of jobs and the information about the jobs; Nature and the employer's expectation; Career Guidance and its significances; Career counseling; Career Planning, The world of work; Higher studies and leadership training; Personality developments; Soft skills; Intra and interpersonal skills; Facing interviews; Writing C.V; Making application for a job; Psychological and socio-economic implications on career developments.</p>		
Teaching and Learning Methods / Activities	Interactive lectures, group discussions, group presentations, assignments, workshops		
Evaluation	Practical (100%)		
	Formative Assessment (30%)		Summative Assessment (70%)
	Assignments - 20% Presentation - 10%		Practical exam - 30% Task based appraisal - 20% Oral - 20%
Recommended readings	<ol style="list-style-type: none"> 1. Gail Evans (2007) Counselling skills for dummies, John Wiley and Sons, Ltd, England 2. Ellen Hansen (2006) Career guidance: A resource book for low and middle income countries, Skills and employability department, International Labour office, Switzerland 3. Katherine L. Hughes and Melinda Mechur Karp (2004) School-Based Career Development: A Synthesis of the Literature, Institute on Education and the Economy Teachers College, Columbia University 4. Brian McIvor (2012) Career detection: Finding and managing your career, Brian McIvor and associates 		