Agro Entrepreneurship and Sustainable Home Gardening (AESH) Syllabus

Module Code	AdvC **Agro-Entr & Sust HG 1101**	**Module Name**	**Agro-technology for Home gardening**		
Credits	2	**Lectures (Hr) + Practical /week** **15+30**		**Pre-requisites**	None
GPA/NGPA	GPA	**Assignments (Hr)**			
Module Aim		The aim of this course module is to provide knowledge and skills to the students for the effective use of agro technology for home gardening. It provides the knowledge about agro-technology and management with available biological, physical resources in environmentally friendly, socially acceptable and economically feasible manner for the production of food, and other agricultural products for the development of home gardening.			
Module Learning Outcomes		LO-1:Explain the definition and branches of Agro-technology in home gardening LO-2: Describe the present status, economic importance, constraints of agro technology for home gardening in Sri Lanka. LO-3: Describe the appropriate, sustainable and novel production techniques of important horticultural crops. (Vegetables, Fruits) LO-4: Identify and suggest possible technical solutions related to the agronomic practices, planting material production and profit-oriented marketing strategies of horticultural crops.			
Module Outline		1.Overview of home gardening: Present status and future potential; Importance of Plant propagation and nursery techniques; Modern practices of Fruit and vegetable based 2. Cropping systems- includes the management of irrigation, Land, pest and disease, post-harvest; Safe and effective crop protection; Multiple cropping and multilayer cropping; Seed production;			

	Processing, preservation and storage; Institutional support for fruit and vegetable sub sector. 3. Agro technology: Present status, availability; types of techniques; uses; effectiveness; constraints; possible solutions.
Marks Allocation	Continuous Assessments (CA) 50% End Assessment 50%
Eligibility to Appear for End Semester Evaluation	.Obtaining 40% for CA
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	Thompson R.P., 2011. Agro- Technology: Cambridge University Press, London Espiritu K., 2019. Field Guide to Urban Gardening: Cool Springer Press

<table>
<tr><td>Module Code</td><td>DAeSHG 1102</td><td>Module Name</td><td colspan="4">Sustainable Waste Management</td></tr>
<tr><td>Credits</td><td>2</td><td colspan="2">Lectures (Hr) + Practical /week
15+30</td><td>Pre-requisites</td><td>None</td></tr>
<tr><td>GPA/NGPA</td><td>GPA</td><td colspan="2">Assignments (Hr)</td><td></td><td></td></tr>
<tr><td colspan="2">Module Aim</td><td colspan="4">This course module explores waste management and how it fits with sustainable development. Moreover, it studies the elements of waste management hierarchy and the environmental, legislative, health and operational aspects involved.</td></tr>
<tr><td colspan="2">Module Learning Outcomes</td><td colspan="4">LO-1: Identify key sources, typical quantities generated, composition, and properties of solid and hazardous wastes;

LO-2: Identify waste disposal or transformation technics (landfills and incinerators);

LO-3: Recognize the relevant regulations that apply for facilities used for disposal, and destruction of waste;

LO-4:Conduct invasive and non-invasive site investigation and understand permitting process for constructing landfills;

LO-5: Identify and design Solid and Hazardous Waste Landfills includingclosure, post-closure, and rehab issues;

LO-6: Estimate typical waste disposal costs;

LO-7: Identify recycling and reuse options (composting, source separation, and re-use of shredded tires, recycled glass, fly ash, etc.).</td></tr>
<tr><td colspan="2">Module Outline</td><td colspan="4">Wastes, Classification, Waste generation and composition, Properties of wastes, Basic requirements of waste management, 3R concept, Waste management techniques, Waste collection, Sorting, Concepts of sustainable waste management, Development of Integrated Sustainable Waste Management System.</td></tr>
<tr><td colspan="2">Marks Allocation</td><td colspan="4">Continuous Assessments 50%

End Assessment 50%</td></tr>
<tr><td colspan="2">Eligibility to Appear for</td><td colspan="4">Obtaining 40% for CA</td></tr>
</table>

End Semester Evaluation	
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	Sustainable Solid Waste Collection and Management, Pires A, Martinho G, Rodrigues S and Gomes M Jonathan W.C. Surampalli R.Y. Zhang TC Tyagi RD SelvamASustainable Solid Waste Management 2016. American Society of Civil Engineers. Liu,Sean X., 2014. Food and Agricultural wastewater utilization and Treatment Chichester, West Sussex, UK John wiley& Sons Inc. Burnley S., 2014. Solid Wastes Management Wiley, Chichester.

Module Code	AdvC **Agro-Entr & Sust HG 1103**	**Module Name**	**Entrepreneurship**		
Credits	2	**Lectures (Hr) + Practical /week** **15+30**		**Pre-requisites**	None
GPA/NGPA	GPA	**Assignments (Hr)**			
Module Aim		The aim of this course is to encourage students on entrepreneurship and engender entrepreneurial knowledge and skills through innovation, capacity development and leadership.			
Module Learning Outcomes		LO-1: Describe the principles of entrepreneurship in a business setting LO-2: Apply creative thinking techniques to generate, evaluate and screen ideas for a potential new business venture. LO-3: Create and present a basic feasibility study for a new business venture.			
Module Outline		1. Entrepreneurship: Emergence and Evolution, what is entrepreneurship, alternative enterprise development for farming, 2. Entrepreneurial Individual and entrepreneurial stress, 3. Entrepreneurship and Innovation: creativity and idea generation, sources of business idea, screening ideas for business opportunity, 4. Planning for startup; Forms of business start-ups; Legal and regulatory issues at start up; Locating the business; Developing a production plan, 5. The Business Plan: Industry analysis; Description of the venture; Production plan; Marketing plan; Organizational plan; Financial plan; Assessment of risk, 6. Presenting a business plan; Accessing what a financial institution wants from a business plan; Pitching a plan to an investor/financial institution			
Marks Allocation		Continuous Assessments 50% End Assessment 50%			
Eligibility to Appear for		Obtaining 40% for CA			

End Semester Evaluation	
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	Agro- Entrepreneurship, Shakti Ranjan and Baljeet Singh Entrepreneurship:How to start & operate a small business, 2005. National Foundation for Teaching Entrepreneurship. Hatten T., 2015. Small Business Management, 6th edition, Cengage Learning.

Module Code	AdvC **Agro-Entr & Sust HG 1104**	**Module Name**	**Pest and Disease Control**		
Credits	2	**Lectures (Hr) + Practical /week** **15+30**		**Pre-requisites**	None
GPA/NGPA	GPA	**Assignments (Hr)**			
Module Aim		This course is designed to introduce students to identify and monitor the major agricultural pests (insect pests and their relatives, plant pathogens and weeds), the benefits of insects, challenges associated with pest management, and methods to manage pests and diseases in home gardens. And also this course discusses the principles of integrated pest management (IPM) and non chemical pest management methods for organic home gardening.			
Module Learning Outcomes		LO-1: Analyze the insect pest, non-insect pest, plant diseases and weeds in agricultural importance and factors that make them as successful pest. LO-2: Identification of beneficial insect and their beneficial characteristic. LO-3:Conservation and mass multiplication of important natural enemies of agricultural pests. LO-4: Identify different pest and diseases management methods and its applicability and benefits in home garden.			
Module Outline		The course describes the characteristics of insect pests and mites and other relatives and factors that make them to become successful pests in home gardens Important disease-causing organisms and their identification, diagnosis and s*ymptomatology* and factors contribute to crop disease			

	development in home gardens. Identification of plant parasitic nematodes and their associated symptoms in crop plants Identification of weeds Identification of nutrient deficiencies, toxicities, herbicide injuries, and other abiotic causes of crop damage Prevention and management of pests, diseases and weeds in home gardens Introduction to Beneficial insects (Predators & Parasites, pathogens, Pollinators, Scavengers, Weed feeders, Insects of aesthetic) and their role in home garden pest management Agrochemicals used in plant protection, biosecurity and occupational health risks. Integrated pest and disease management and its benefits under home gardens
Marks Allocation	Continuous Assessments 40% (Class room activities 10%; Practicals30%) End Assessment 60%
Eligibility to Appear for End Semester Evaluation	Obtaining 40% for CA
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	General Concepts in Integrated Pest and Disease Management Editors: **Ciancio**, A., **Mukerji**, K.G. (Eds.) Alford D.V., 2000. Pest and Disease Management Handbook.British Crop Protection Enterprises. Abrol D.P. and Shankar U., 2012, Integrated Pest management: Principles and Practice. CABI.

Module Code	AdvC **Agro-Entr & Sust HG 1105**	**Module Name**	**Livestock in Home gardening**			
Credits	2	**Lectures (Hr) + Practical /week** **15+30**			**Pre-requisites**	None
GPA/NGPA	GPA	**Assignments (Hr)**				
Module Aim		Aim of this course is to deliver knowledge and skills and, to develop attitude to keep livestock as a component of a home garden that contribute positively toward the household, environment and the society				
Module Learning Outcomes		LO-1: discuss the importance of livestock as a component of a home garden LO-2: decide the most suitable component of livestock under a given situation LO-3:keep livestock as a component of integrated home gardening system LO-4: make home gardening environmentally and socially more acceptable				
Module Outline		1.Livestock and household food and nutritional security, Role of livestock in a home garden, 2. Potentials and constraints of introducing livestock as a component of home garden, 3. Breeds of livestock suitable under different conditions, 4. Keeping of family poultry, 5. Household-level dairy farming, 6.Backyard piggery, 7. Keeping of micro livestock, 8. Environmental and social impacts of livestock in home garden, 9.Livestock farming with care, 10.				

	Integrated livestock production system, family livestock and food safety, family livestock and health, market opportunities for home-garden-livestock products
Marks Allocation	Continuous Assessments 50% End Assessment 50%
Eligibility to Appear for End Semester Evaluation	Obtaining 40% for CA
Necessary Conditions to pass the Module	Obtaining 40% for End semester examination
Recommended Readings	Livestock: Production, Management, Stratergies and Challenges, Victor Roy and Wayne Bryden Robert C., 2019. Livestock Management in Farming and Feeding System. Tritech Digital Media. Hassey C.,2017.Livestock Management.

<table>
<tr><td>Module Code</td><td>AdvC
Agro-Entr & Sust HG 1106</td><td>Module Name</td><td colspan="3">Hygienic Milk and Food Processing and Preservation</td></tr>
<tr><td>Credits</td><td>2</td><td colspan="2">Lectures (Hr) + Practical /week
15+30</td><td>Pre-requisites</td><td>None</td></tr>
<tr><td>GPA/NGPA</td><td>GPA</td><td colspan="2">Assignments (Hr)</td><td></td><td></td></tr>
<tr><td colspan="2">Module Aim</td><td colspan="4">Knowledge on Food Preservation and Processing is vital in any kind of food industry, and thus, the current course is structured with main techniques that are useful in food industry level.</td></tr>
<tr><td colspan="2">Module Learning Outcomes</td><td colspan="4">LO-1: Identify major ways of food spoilage
LO-2: Explain major food preservation techniques
LO-3:Apply appropriate preservation techniques for different food products
LO-4:Identify major unit operations in food processing
LO-5: Apply the knowledge to produce own food product</td></tr>
<tr><td colspan="2">Module Outline</td><td colspan="4">Theory Lessons
1. Food spoilage, 2. Introduction to food preservation and major preservation techniques used in food industry, 3. Hurdle technology in food preservation, 4.Unit operations in food preservation, 5. Post processing operations, 6. Preservation and processing of fruits and vegetables, 7. Preservation and processing of dairy products, 8. Preservation of processing of fish and meat

Practical Schedule:
1. Prevention of enzymatic spoilage of fruits and vegetables by blanching
2. Prevention of browning reaction in foods by sulphiting
3. Examine the effect of humectants
4. Dehydration of fruits and vegetables
5. Minimal processing of foods
6. Food product development
7. Basic tests to evaluate milk quality
8. Value added products from milk
9. Value added products from meat and fish</td></tr>
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Marks Allocation	Continuous Assessments 40% (laboratory assignments (30%, online quizzes 10%) End Assessment 60%
Eligibility to Appear for End Semester Evaluation	Obtaining 40% for CA
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	Handbook of Hygiene Control in the Food Industry, Edited by: HuubLelieveld, John Holah and DomagojGabri. Brennan J.G. and Grandison A.S., 2011. Food Processing Handbook: Second Edition. Wiley-VCH Verlag GmbH &Co.KGaA Lelieveld H., Holah J. and Napper D., 2013. Hygiene in Food Processing, Second Edition. Woodhead Publishing.

Module Code	AdvC **Agro-Entr & Sust HG 1107**	**Module Name**	**Commercial Apiculture**		
Credits	1	**Lectures (Hr) + Practical /week** **5+20**		**Pre-requisites**	None
GPA/NGPA	GPA	**Assignments (Hr)**			
Module Aim		This is a practical course which introduces the subject on Apiculture (beekeeping) and aim of the course is, by practical and theoretical teaching, to put students in touch with formation necessary for beekeeping and all particular disciplines of apidology as follows: management of pollination, basic principles of honey bee management, bee equipment used and manipulations required for scientific honey production, honey harvesting and processing, rearing of queens and breeding of honey bee and etc. The students will gain practical experience in handling and managing apiaries, basic skills in thriving in apiculture as self-ventures and/or professionals in the field of apiculture			
Module Learning Outcomes		LO-1: describe the history and evolution of beekeeping and importance of beekeeping and other pollinators in agriculture LO-2: examine the diversity and biogeography of honey bees LO-3:discover the intricacies of honey bee biology, anatomy, physiology and colony organization LO-4:implement the knowledge and practical aspects on managing a commercial apiary LO-5:associate apiculture with production agriculture, ecosystem health and human success			
Module Outline		1.Introduction to apiculture, Anatomy and physiology of honey bee and adaptations for ecology, Social organization of bee colony 2. Principles of Commercial Beekeeping, Bee husbandry- General management of honeybee colonies 3. Management of Swarming, Supplementary feeding for the prevention of Absconding and Pest incidence, Honey bee pests and disease 4. Honey Extraction, Processing, Value addition and Other Hive Products 5.			

	Entrepreneurial Beekeeping 6. Honeybees into the Future Field visits to an apiary and Apiculture Research Institute, Bindunuwewa.
Marks Allocation	Continuous Assessments 50% End Assessment 50%
Eligibility to Appear for End Semester Evaluation	Obtaining 40% for CA
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	Fundamentals of Beekeeping TV Sathe Economic Importance of Apiculture Suresh Rao and Sanjanarawat Hilmi M., Bradbear N. and Mejia D., 2011.Beekeeping and Sustainable Livelihoods, Second edition. Rural Infrastructure and Agro-Industries Division: Food and Agriculture Organization of the United Nations, Rome.

<table>
<tr><td>Module Code</td><td>AdvC
Agro-Entr & Sust HG 1108</td><td>Module Name</td><td colspan="4">Floriculture</td></tr>
<tr><td>Credits</td><td>1</td><td colspan="2">Lectures (Hr) + Practical /week
5+20</td><td></td><td>Pre-requisites</td><td>None</td></tr>
<tr><td>GPA/NGPA</td><td>GPA</td><td colspan="2">Assignments (Hr)</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Module Aim</td><td colspan="5">The aim of this course module is to provide knowledge and practical skills to students for the production of cut flowers and foliage species with demand. This course will provide the hands on experience in production, management and marketing of high demanding ornamental species.</td></tr>
<tr><td colspan="2">Module Learning Outcomes</td><td colspan="5">LO-1: Explain the definition high demanding ornamental species

LO-2: Describe the present status, economic importance and constraints of floriculture sector Sri Lanka.

LO-3:Describe the appropriate, sustainable and novel production techniques of producing important ornamental species

LO-4:Identify and suggest possible technical solutions related to the agronomic practices, planting material production and profit-oriented marketing strategies of floricultural species

LO-5:Sustainable maintenance of ornamental nurseries</td></tr>
<tr><td colspan="2">Module Outline</td><td colspan="5">1. Overview of Floriculture: Present status and future potential; 2. Introduction of flowering and ornamental species with high demand; 3. Importance of Plant propagation and nursery techniques; 4. Modern practices of ornamental plant production-includes the management of irrigation, Land, pest and disease, post-harvest; 5. Ornamental plant nurseries and their management; 6.Marketing of ornamental plants; 7. Institutional support for ornamental plant sector.

There will be practical demonstrations and field visits</td></tr>
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Marks Allocation	Continuous Assessments 50% End Assessment 50%
Eligibility to Appear for End Semester Evaluation	Obtaining 40% for CA
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	Introduction to Floriculture Roy A Larson Foliage Plant Production DLCK Fonseka and WWUI Wickramaarachchi Jaime A. and Silva T., 2006. Floriculture, Ornamental and PlantBiotechnology: Advances and Topical Issues. Global Science Books. Ltd.

<table>
<tr><td>Module Code</td><td>AdvC Agro-Entr & Sust HG 1109</td><td>Module Name</td><td colspan="4">Aquarium management and Aquaphonics</td></tr>
<tr><td>Credits</td><td>1</td><td colspan="2">Lectures (Hr) + Practical /week
5+20</td><td></td><td>Pre-requisites</td><td>None</td></tr>
<tr><td>GPA/NGPA</td><td>GPA</td><td colspan="2">Assignments (Hr)</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Module Aim</td><td colspan="5">This course is designed to give students, the knowledge of the basic principles of Aquaculture by introducing the Aquaculture sector in Sri Lanka with Aquarium management techniques of ornamental fish, finfish, shell fish and other aquatic plants.</td></tr>
<tr><td colspan="2">Module Learning Outcomes</td><td colspan="5">LO-1: To identify, understand, and analyze the present situation and problems in Aquaculture and sector

LO-2: To establish a fish farm giving emphasize to major technological and economic parameters

LO-3:To develop and promote the national income and food security of the country.</td></tr>
<tr><td colspan="2">Module Outline</td><td colspan="5">1: Introduction 2. Types of aquariums /fish farms, 3. Water eco systems and quality management, 4. Aquarium designing, 5. Suitable farming species, 6. Health and disease management, 7.Tanks and maintenance, 8. Fish breeding and genetics, 9. Fish Nutrition, 10. Transportation, 11.Invasive species and biodiversity, 12.Trade regulations and wild life act in relation to fish farming, 13. Pollution and effluent management 14. Filed visit s (Udawalawe fish breeding center and Rambodagalle ornamental fish breeding Center)</td></tr>
<tr><td colspan="2">Marks Allocation</td><td colspan="5">Continuous Assessments

1. students log book 10%

2. Self Learning through References and Assignments 10%

3. Field visist 10%</td></tr>
</table>

	End Assessment 70%
Eligibility to Appear for End Semester Evaluation	Obtaining 40% for CA
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	Aquaphonic Gardening Sylvia Bernstein Southern A. and King W., 2017. The Aquaphonic Farmer. New Society Publishers. Packer B., 2014. Aquaphonics System: A Practical Guide To Building And Maintaining Your Own Backyard Aquaphonics. First Edition: CreateSpace Independent Publishing Platform. Small Scale Aquaphonic Food Production, 2014. Food and Agricultural Organization, Rome.

<table>
<tr><td>Module Code</td><td>AdvC
Agro-Entr & Sust HG 1110</td><td>Module Name</td><td colspan="4">Mushroom Production Technologies</td></tr>
<tr><td>Credits</td><td>1</td><td colspan="2">Lectures (Hr) + Practical /week
5+20</td><td>Pre-requisites</td><td>None</td></tr>
<tr><td>GPA/NGPA</td><td>GPA</td><td colspan="2">Assignments (Hr)</td><td></td><td></td></tr>
<tr><td colspan="2">Module Aim</td><td colspan="4">To increase the awareness about production and consumption of mushrooms and to help create new employment opportunities for youth through mushroom cultivation. This will empower rural/sub-urban communities with entrepreneurial skills through the production and sale of mushrooms</td></tr>
<tr><td colspan="2">Module Learning Outcomes</td><td colspan="4">LO-1: Identification of mushrooms and their lifecycle
LO-2: Identification the nutritional value of mushrooms
LO-3:Describe the factors need to consider when designing a house for mushroom
LO-4:Describe the different substrate and sterilization methods
LO-5:Explain different cultivation methods
LO-6: Analyse the cost for mushroom farming as a venture</td></tr>
<tr><td colspan="2">Module Outline</td><td colspan="4">1. Introduction to mushrooms, Mushroom life cycle,collection and identification, Nutritional, and medicinal value of mushrooms, Importance of mushroom as a cottage industry in Sri Lanka,
2. Factors to be considered when designing a cropping house, substrate preparation, steam sterilization, and incubation.Different mushroom cultivation methods, Harvesting, marketing and storage of mushrooms, Spawn production process, Pests, diseases and other problems associated with mushroom cultivation and their management, Project cost – analysis of mushroom farming.
[There would be a practical demonstration on various steps on mushroom cultivation during the course].</td></tr>
<tr><td colspan="2">Marks Allocation</td><td colspan="4">Continuous Assessments 50%</td></tr>
</table>

	End Assessment 50%
Eligibility to Appear for End Semester Evaluation	Obtaining 40% for CA
Necessary Conditions to pass the Module	Obtaining 40% for end semester examination
Recommended Readings	MUSHROOM CULTIVATION TECHNOLOGY, R. Gogoi, Y. Rathaiah and T.R. Borah Pathak V.N., Yadav N. and Gaur M., 2000. Mushroom Production And Processing Technology. Agrobios, India. Handbook on Mushroom Cultivation and Processing, 2011. NIR Board of Consultants & Engineers, Asia pacific Business Press Inc.