

**University of Gondar**

**College of Agriculture and Environmental Sciences**

**Department of Horticulture**

**Syllabus for Master Degree in Horticulture, Semester II, 2012 EC**



**Gondar, Ethiopia**

**HORT-522 Advanced Fruit Crops Production and Management 3(2+1)**

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| Course Title | Advanced Fruit Crops Production and Management |
| Course Code | HORT-522 |
| MSc Program | Horticulture |
| Credit Hours | 3(2+1) |
| Target Group | MSc. In Horticulture, First Year Students |
| Year/semester | Year-I, Semester-II |
| Status of the  course | Compulsory |
| Course  Objectives |  To explain fruit crops production status in the world, and in Ethiopia   To explain about the economical and nutritional importance of fruits crops in Ethiopia   To advance the theoretical knowledge about the ecological and edaphic  requirements of fruit crops production in Ethiopia   To apply the skills of orchard site establishment and management   To equipped the principles of fruits crops production and its management   To developed the skills of various fruits crops propagation methods   To analyse the major production constraints of fruits crops in Ethiopia |
| Course  Descriptions | National and International scenario in fruit production, Commercial varieties  of regional, national and international importance; Recent advances in propagation - root stock influence, cropping and planting systems; , eco physiological requirements; root zone and canopy management; Crop modeling , Aspects of crop regulation- physical and chemical regulation |

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|  | effects on physiology and development, influence of stress factors, strategies  to overcome stress effects, integrated and modern approaches in water and nutrient management, water management, fertigation, role of bio regulators, abiotic factors limiting fruit production, physiology of flowering, pollination fruit set and development, honeybees in cross pollination, physiological disorders- causes and remedies, quality improvement by management practices; maturity indices, harvesting, grading, packing, storage and ripening techniques; industrial and export potential. | |
| Contact Content | Chapter | Content |
| Chapter 1 | Introduction:   Challenges and opportunities of Fruits Production in Ethiopia;   Unfruitfulness in orchards |
| Chapter 2 | Pollination management:   Pollination management;   Pollinizers and pollinators |
| Chapter 3 | Banana:   Ecological requirements;   banana varieties;   crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination and harvesting, post- harvest handling and value addition) |
| Chapter 4 | Pineapple:   Ecological requirements;   Pineapple varieties;   Crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination and harvesting, post- harvest handling and value addition) |
| Chapter 5 | Mango:   Ecological requirements;   Mango varieties;   Crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination and harvesting, post- harvest handling and value addition) |
| Chapter 6 | Papaya:   Ecological requirements;   crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination |

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|  |  | and harvesting, post-harvest handling and value  addition) |
| Chapter 7 | Guava:   Ecological requirements;   guava varieties;   crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination and harvesting, post- harvest handling and value addition |
| Chapter 8 | Citrus:   Ecological requirements;   citrus varieties;   crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination and harvesting, post-harvest handling and value addition) |
| Chapter 9 | Avocado;   Ecological requirements;   Avocado varieties;   Crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination and harvesting, post-harvest handling and value addition) |
| Chapter 10 | Grape:   Ecological requirements;   Grape varieties;   Crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination and harvesting, post-harvest handling and value addition) |
| Chapter 11 | Apple:   Ecological requirements;   Apple varieties;   Crop husbandry (propagation, plant nutrition, major diseases and pests, maturity determination and harvesting, post-harvest handling and value addition) |
| Chapter 12 | Peach:   Ecological requirements;   Peach varieties;  Crop husbandry (propagation, plant nutrition, major diseases and pests, |

maturity determination and harvesting, post-harvest handling and value addition)

**Teaching Methodology:** lectures, discussion, questioning and answering, readings, assignments, individual and/or group works and presentation.

**Assessment methods:**

Evaluation will be carried out based on continuous assessment which comprises: Midterm exam 40%

Term paper 20% Final exam 40% **Total 100%**

**References**

1. Derbew Belew and Jeong Cheon Soon, 2014. Fruit Production in Ethiopia. Kangwon National

University (KNU) Press.

2. Prakash P. Deshmukh 2010. Fundamentals and Production Technology of Fruit Crops in India.

Himalaya Publishing House, India

3. Mark Rieger, 2010. Introduction to Fruit Crops, CRC Press

4. Hartmann & Kester's Plant Propagation: Principles and Practices, 8th Edition

5. Hudson T. Hartmann, Dale E. Kester, Davis, Fred T. Davies, & Robert Geneve, 2011. *Plant*

*Propagation – Principles and Practices*.8th Edition, pearson.

6. Bose TK, Mitra SK & Sadhu MK. 1991. *Propagation of Tropical and Subtropical Horticultural*

*Crops*. Naya Prokash.

7. Bose TK, Mitra SK & Sanyal D. (Eds.). 2001. *Fruits -Tropical and Subtropical*. Naya Udyog

**HORT -512 Advanced Vegetable Crops Production and Management 3 (2+1)**

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| Course Title | Advanced Vegetable Crops Production and Management |
| Course Code | HORT-512 |
| MSc Program | Horticulture |
| Credit Hours | 3(2+1) |
| Target Group | MSc in Horticulture, First year students |
| Year/semester | Year 1 /semester II |
| Course Objectives | At the end of this course students will be able to:   Discuss the characteristics, nutrition, economic and social  importance of vegetable crops   Analyze the prospects and constraints of vegetable production in Ethiopia   Describe the climate and soil requirements for successful  vegetable production   Establish vegetable farms and manage them successfully   Set production and marketing plans for major vegetable crops   Demonstrate nursery and field management practices of  vegetable production   Demonstrate the different harvesting and postharvest handling techniques of major vegetable crops   Train vegetable growers or farmers in vegetable production  issues and new developments |
| Course Descriptions | This course will equip horticulture students with the basic and advanced  principles of vegetable crops production and management, as well as |

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|  | harvesting, postharvest handling, marketing and consumption of  vegetable products. It also covers issues such as diagnosis of nutritional and physiological disorders; light intensity in different cropping situation; assessing nutrient status, use of plant growth regulators; practices in herbicide application; estimating water requirements in relation to crop growth stages, harvesting and handling issues; Production techniques for stressed condition. In addition it will enable students with basic skills of how to produce major vegetable crops and handle their products. At last they will be familiarized with major progresses in vegetable crops research and current production packages. |
| Contact Content | Content |
|  | Chapter 1. Introduction   Current production and research status of vegetable crops in  Ethiopia   Prospects/potentials of vegetable production and marketing in  Ethiopia  Chapter 2. General principles and practices of quality planting material production and management   Commercial nursery establishment   Qquality seedling production  Chapter 3. Environmental factors affecting vegetable production   Abiotic factors   Climatic factors- Drought   Soils factors- Salinity   Biotic factors- diseases, insect pests, weeds  Chapter 4. Harvesting and postharvest handling of vegetables  Chapter 5. Production technology of vegetables commonly grown in  Ethiopia |

**Practical**

Field and laboratory practical’s will be arranged to identify and tackle problems on vegetable crops production and management; preparing and layout of nursery beds; managing of nursery sites/beds by growing different vegetables; identifying vegetable species; determining of moisture, purity, germination percentage and viability of different types of vegetable seeds; and providing of trainings to vegetable growing farmers.

**Evaluation** will be carried out based on continuous assessment which comprises:

 Practical/ lab. report 20%

 Term paper 30%

 Final exam 40%

Total 100%

**Teaching -Learning Processes**

Introductory lectures, discussion, questioning and answering, readings, individual and/or group works and presentation.

**References**

 Adams C.R. and Early M.P., 2004, Principles of Horticulture. Elsevier Publications

 Anonymous, 1995. Vegetable and Spice Production, Hort. Res. And Dev. Project. FAO/ UNDP/ADP Project No. BGD/87 025.

 Bose, T.K. and M.G. Som. 1990. Vegetable Crops in India. Naya Prokash, Calcutta, India.

 Jaime Prohens and Fernando Nuez, 2008. Vegetables II, Fabaceae, Liliaceae, Solanaceae, and

Umbelliferae. Springer publisher.

 Knott’s, 2007. Handbook for Vegetable Growers, Fifth Edition. John Wiley & Sons, Inc.

 Mitra, S,K., T.K. Bose and M.K. Sadhu 1990. Nutrition of Vegetable Crops. Naya Prokash, Calcatta, India.

 Bose TK, Kabir J, Maity TK, Parthasarathy VA & Som MG. 2003. *Vegetable Crops*. Vols. I-III.

Naya Udyog.

 Bose TK, Som MG & Kabir J. (Eds.). 2002. *Vegetable Crops*. Naya Prokash

 Ramasamy C., Kannan R., Dhanavel K., 2004. Crop Production Techniques of Horticultural

Crops. [http://www.tnau.ac.in.](http://www.tnau.ac.in/)

 Raymond A.T. George, 2009. Vegetable Seed Production, 3rd Edition. CAB International.

 Sammugavelu, K.G. 1989. Production Technology of Vegetable Crops. Oxford & IBH Publishing

Co., Pvt. Ltd. New Delhi.

 Gopalakrishanan TR. 2007. *Vegetable Crops*. New India Publ. Agency

**HORT-532 Post-Harvest Physiology and Handling of Horticultural Crops 2(1+1)**

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| Course Title | Postharvest Physiology and Handling of Horticultural Crops |
| Course Code | HORT-532 |
| MSc Program | Horticulture |
| Credit Hours | 2(1+1) |
| Target Group | MSc in Horticulture, First year students |
| Year/semester | Year 1 /semester II |

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| Course  Objectives | At the end of this course students will be able to:   discuss the extent of postharvest loss and the importance of proper postharvest handling   Discuss the different physiological and biochemical changes that takes place in harvested produces   explain how different pre-harvest factors influence the postharvest nature of products   identify different pre-cooling methods and illustrate the importance of pre-cooling   identify the common horticultural postharvest treatments and explain their importance   discuss the principles and importance of packaging   identify the common postharvest pathogens and their control options   discuss the technology of storage   describe the role of biotechnology in postharvest   postharvest losses reduction mechanisms in horticultural crops |
| Course  Descriptions | The course is designed to provide comprehensive knowledge and skills on the postharvest physiological processes and handling of horticultural products particularly fruits, vegetables and cut flowers and cut foliages. The course covers - Introduction to postharvest; postharvest physiological processes and their impact on harvested products; physiology and biochemistry of fruit growth and ripening; ethylene evolution and ethylene management; types, extent and causes of post-harvest loss; postharvest principles and practices of (fruits, vegetables, cut flowers and foliages), pre-harvest and postharvest external factors that affect quality and shelf life of harvested products; pre- cooling and post-harvest treatments; Postharvest operations; packaging and packhouse operations; transportation; types of storage, postharvest Physiological and pathological disorders; role of biotechnology in postharvest; cold chain mangement |
| Contact  Content | Content |
| 1. Introduction  1.1.Postharvest Loss in Horticultural crops  1.2.Types, extent and causes  1.3.Factors that cause postharvest losses  2. Ontogeny and structure of fruits and vegetables  2.1.Ontogeny and structure  2.2.Composition  3. Metabolic Processes in Harvested produces  3.1.Respiration  3.1.1. Importance of respiration  3.1.2. Mechanisms and pathways of respiration  3.1.3. Factors influencing respiration  3.1.4. Methods of controlling respiration  3.2.Transpiration and Water Stress |

3.2.1. Role of transpiration in cooling

3.2.2. Economic effects of transpiration

3.2.3. Factors affecting transpiration

3.2.4. Methods of minimizing transpiration

3.3.Ripening and Senescence

3.3.1. Maturity indices

3.3.2. Changes during ripening

3.3.3. Factors influencing ripening and senescence

3.4.Phytochemicals effects

3.4.1.Biosynthesis and mode of action

3.4.2.Sources and effects of ethylene

3.4.3.Methods of controlling ethylene actions

4. Harvesting Systems and Transportation for Horticultural crops

4.1. Timing and methods of harvesting

4.2. Tools and containers for harvesting

4.3. Field packing and transportation

5. Post-harvest Quality

5.1. Types and measurement of quality parameters of harvested produce

5.2. Factors affecting post-harvest quality

5.3. Methods of maintaining and enhancement of quality

6. Pack-house operations

6.1. Reception

6.2. Sorting and cleaning

6.3. Pre-cooling, pre-treatment and packaging

7. Preparation for fresh market

8. Maturation and Maturity indices

9. Physchrometrics in postharvest

9.1. Definition

9.2. The psychrometrics

9.3. The psychrometrics chart

9.4. Water activity

9.5. Applications of psychrometry

10. Cooling of Horticultural commodities and Cold Chain management

10.1. Cold chain management

10.2. Calculation of cooling loads

11. Storage of Horticultural crops

11.1. Parameters of storage

11.2. Types of storage

11.3. Design and construction of storages

12. Postharvest Pathology

13. Packaging of horticultural crops

14. Postharvest handling of selected major horticultural crops

15. Introduction on processing of horticultural crops

**Practical**

Identification of maturity indices for perishable crops, Physiological and storage disorders, Measurement of quality parameters, Evaluation of different storage structures, Monitoring the effects of ethylene

**Teaching -Learning Processes**

Introductory lectures, discussion, questioning and answering, readings, assignments, individual and/or group works and presentation.

**Evaluation** will be carried out based on continuous assessment which comprises:

 Practical/ lab. report 20%

 Term paper 30%

 Final exam 40% Total 100%

**References**

 Kader, A. (2011). Postharvest Technology of Horticultural crops. 3rd edition of E-edition.

University of California, Agriculture and Natural Resources, USA.

 Kays, S.J. (1998). Postharvest physiology of perishable products. CBS Publishers & distributors, New Delhi

 Mitra, S.K. (1997). Postharvest physiology and storage of tropical and subtropical fruits. CAB

international

 Wills, R., B. McGlasson, D. Graham and D. Joyce (1998). Postharvest: An introduction to the physiology and handling of fruits, vegetables and ornamentals. CAB International.

 Swamy, R.H. (2006) Post-harvest technology, McGill

 Batty, J. Clair; and Folkman, Steven. L (1983). Food Engineering Fundamentals.

 Nickerson, John T. and Ronsivall, L. (1976), Elementary Food Science.

 Sahay, K.M and Singh, K.K. (2001). Unit operations of Agricultural Processing (Second Edition).

 Salunkhe, D.K., Bolin, H.R. and Reddy N.R (1991). Storage, processing and Nutritional quality of

Fruits and vegetables (2nd edition) volume I – Fresh Fruits and vegetables. CRC. Press. Inc.

 Wills, R.; McGlasson, W.B., Graham, D.; Lee, T.H., and Hall, E.G. (1989). Post-harvest – An introduction to the physiology &d Handling of Fruits and vegetables. New South, University Press Ltd Australia.

 Narayanasamy, P. 2006. Postharvest pathogens and disease management.

**HORT -542Advanced Ornamental Crops Production and Landscaping 2(1+1)**

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| --- | --- |
| Course Title | Advanced Ornamental Crops Production and Land Scaping |
| Course Code | HORT-542 |
| MSc Program | Horticulture |
| Credit Hours | 2(1+1) |
| Target Group | MSc in Horticulture, First year students |
| Year/semester | Year 1 /semester II |
| Course  Objectives | **At the end of this course students will be able:**   To explain history of ornamental crops production in the world   To elaborate ornamental crops production current status in Ethiopia |

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|  |  To advance the knowledge about the importance of ornamental crops  production in Ethiopia   To identify ecological and soil requirements for the production ornamentals crops in Ethiopia   To advance the skills of identifying major ornamental crops produced in Ethiopia   To identify major ornamental crops production constraints   to design appropriate landscape |
| Course  Descriptions | This course deals with introduction to ornamental crops, turf grass production  in the world and Ethiopia, importance of ornamental crops production, role of flower production in the Ethiopia economy, propagation, production and management of growing environmental factors. In addition to this students will be able to develop the skills of landscape designing, Flower forcing and year round flowering through physiological interventions, chemical  regulation, and environmental manipulation. and fertigation, major diseases and insect pests of ornamental crops and turf grass. The course will cover crops**:** Cut rose, cut chrysanthemum, carnation, gerbera, gladioli, tuberose, orchids, anthurium, aster, liliums, bird of paradise, heliconia, alstroemeria, alpinia, gypsophilla, limonium, statice, stock, cut foliages and fillers. |
| Contact Content | Content |
| 1. Production and Management of flowers & ornamental plants:  1.1. Eco-physiology and commercial production of roses, chrysanthemum, carnation, dahlia, tuberose, gladiolus, marigold, orchids and cacti  2. Cut flower management:  2.1.Harvesting, selection and arrangement of flowers.  2.2.Postharvest change in cut flowers, their handling and marketing.  2.3.Techniques of dry flower preparation  3. Special structures of ornamental plants:  3.1.Arches,  3.2.Pergolas,  3.3.Bonsai and  3.4.Topiary  4. Landscape horticulture and its design:  4.1.Concept and definition  4.2.Objectives and categories of landscape horticulture  4.3.Scope and importance of landscape gardening in Ethiopia  4.4.Introduction to survey  4.5.Landscape design: landscape professionals, elements of design, principles of design, Landscape planning for different places (residential and nonresidential landscape)  5. Turf and Ground Cover management  5.1.Building, care and maintenance of turf grasses and ground covers in parks and landscaping  5.2.Includes soil preparation, planting, fertilizing, maintenance of |

common and special turf grasses and ground covers, and

5.3.Pest and disease problems and their control

6. Establishing complex Biotopes

6.1.Rock garden

6.2.Water garden

6.3. Embellishments

7. Exhibition of ornamental plants:

7.1.Flower Arrangement

7.2.Types of Floral Design

7.3.Preparation and management for flower show and garden competition

**Practical**

Botanical description of varieties, propagation techniques, mist chamber operation, training and pruning

techniques, practices in manuring, drip and fertigation, foliar nutrition, growth regulator application, pinching, disbudding, staking, harvesting techniques, post-harvest handling, cold chain, project preparation for regionally important cut flowers, visit to commercial cut flower units and case study

**Teaching -Learning Processes**

Introductory lectures, discussion, questioning and answering, readings, assignments, individual and/or group works and presentation

**Evaluation** will be carried out based on continuous assessment which comprises:

 Practical/ lab. report 20%

 Term paper 30%

 Final exam 40% Total 100%

**References**

 Bose, T.K. and L.P. Yadav. 1989. Commercial Flowers. Naya prakash. Calcutta. India.

 Bose, T.K. Tropical Garden Plants. Naya Prokash, Calcutta, India.

 Grindal, E.W. 1960. Everyday Gardening in India. D.A Tara, Porevala Sons & Co. Bombay.

 Kuck and Tongg. 1960. The Modern Tropical Garden. Tongg Pub. Co., Honolulu, Hawai, USA.

 Laurie, A. D. C. Kiplinger and K. S. Nelson. 1979. Commercial Flower Forcing. McGraw Hill Co., New York.

 Laurie & Ries (1950). Floriculture: Fundamentals and practices. Mc Graw- Hill Book Co. Inc., U.S.A.

 Leroy Hannebaum (1990). Landscape Design: a practical approach. Prentice Hall inc., New jersey.

U.S.A.

 Malcom Ashwell & Sally Pearson (1995). Professional Floristry Techniques. Miller Freeman professional Ltd., UK.

**Horticultural Crops Protection HORT-552 2(1+1)**

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| **Course Title** | Horticultural Crops Protection |
| **Course Code** | HORT-552 |
| **Program** | MSc in Horticulture |

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| **Credit Hours** | 2(1+1) |
| **Target Groups** | MSc in Horticulture |
| **Year /Semester** | year I, seme.II |
| **Status of the**  **course** | compulsory |
| **Course**  **Description** | The course will deal with the principle and practices of horticultural crops  protection (diseases, insect pests and weeds). In addition to this traditional and novel Horticultural crops disease, insect pest and weeds management tactics/ strategies such as chemical controls and application methods, fungicide / herbicide and pesticides resistance, disease and insect pest warning and other decision aids, biological control and ecology of plant pathogens, host resistance, cultural practices, and host-pathogen. Integrated pest management, and socioeconomic aspects of pest management also discussed. Emphasis will be placed on the underlying scientific principles and their integration. Identification and managements of major horticultural crops diseases, insects' pests and weeds in Ethiopia will also be covered. |
| **Course Objectives** |  To update the principles of horticultural crops protection methods   to identify economically important insect pests of Horticultural crops in  Ethiopia   To explain the major horticultural crops disease and insect pest in Ethiopia   To equip the skills of isolating, culturing and inoculation of pathogens   To discuss the impacts of disease and insect pests on the quality and quantity of horticultural crops   To design an integrated horticultural crops disease management approaches   to discuss noxious weed in Ethiopia   To evaluate the current horticultural crops disease management strategies |
| **Course Contents** | 1**. Introduction**   Concept of disease and insect pests in horticultural crops   Introduction to horticultural crop pests and noxious weeds   Types of plant diseases   Losses caused by diseases (insects pest, pathogens and weeds)  **2. Diagnosis of Horticultural crops diseases**   Disease symptom & sign   Disease Detection   Disease Sampling   Decision tools and threshold   Ecological theory and IPM   Socioeconomic factors and IPM implementation  **3. Major Horticultural Crops Etiologies**   Diseases caused by fungal pathogens   Diseases caused by bacterial diseases pathogens   Diseases caused by viral diseases pathogens   Diseases caused by nematode disease pathogens   Diseases caused by major insect pests   Effects of noxious weeds and its implication to disease development  **4. Horticultural Crops Management Methods**   cultural control   outdoor/ filed control   indoor/ protected culture |

 Quarantine

 Chemical control

 fungicide resistance

 pesticide and herbicides risk and benefit assessment

 application technology

**5. Biological control**

 what is new in biological control

 enhancing bio-control through microbial ecology

 enhancing bio-control through molecular biology

 bio-control risk

**6. Genetics control**

 Classical genetic control

 Induced resistance

 Transgenic plants

**practical:** sampling and detection of major horticultural crops pathogen , isolation and characterization of fungi pathogen, fungicide resistance pathogen trial , identify major horticultural insect pests and weeds in Ethiopia, identification of GMO plant in Ethiopia, visit farms and observe the impact of pathogens on horticultural crops , visit plant clinic

**Teaching -Learning Processes**

Lecture, Audiovisual aids and posters,, Group discussion, , Questioning and answering, Tem paper and presentation , lab/practical work

Evaluation will be carried out based on continuous assessment which comprises:

 Term paper writing and presentation 30%

 Field and lab report 20%

 Final exam 50%

**Total 100%**

**References**

 Agrios, G.N. 2005. Plant Pathology, 5th edition. Academic Press, New York.

 Chuabe, H.S. 2001. Introductory Plant Pathology, 1steditition. Army Printing Press, Lucknow, India. PP. 443.

 Lucas, G. B., Campbell, C.L., and Lucas, T.L. 1997. Introduction to Plant Diseases: Identification

and Management. 2nd edition. Nazia Printers, LalKuan, Delhi, India. PP.364

 Mehrota R.S. And Ashok Aggaraval, 2004. Plant Pathology, Second edition. Tata Mcgraw-Hill

Publishing Company limited. New Delhi.

 Sharma. P.D. 2001. Plant Pathology, 1st edition. Rajsons printer, New Delhi, India

 Hance, R.J. and Holly, K. 1990. Weed Control Hand Book: Principles. 8th ed. Blackwell Scientific

Publication, Oxford, London. Pp.582.

 Mandal, R.C. 2010. Weed, Weedicides and Weed Control: Principal and Practices. AGROBIOS, India. Pp. 306.

 Steven, R., Jodie, H. and Claudio, G. 1997. Weed Ecology: Implications for Management. 2nd ed.

John Wiley and Sons, Inc., New York. Pp. 589.

 Zimdahal, R.L. 2004. Weed – Crop Competition. 2nd ed. Blackwell Scientific Publication, Oxford, London. Pp.220

 Entomology and pest management, 2nd edition, Larry P. Pedigo, ISBN 0-13-373531-1, 1996

 The insects structure and function, 4th edition, R.F. Chapman, Cambridge University press, 1988

 An introduction to the study of insects, 4th edition, Donald J. Borrer, Dwight M. Deling, Charles

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**HORT-562 Advanced coffee and Spice Crops Production and Processing 3(2+1)**

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| Course Title | Advanced coffee and Spice Crops production and processing | |
| Course Code | HORT-552 | |
| MSc Program | Horticulture | |
| Credit Hours | 3 (2+1) | |
| Target Group | MSc in Horticulture, First year students | |
| Year/semester | Year 1 /semester 1I | |
| Course  Objectives | **At the end of this course, students will be able to:**   Describe briefly history of coffee and spice trade in the world.   Select and manage coffee and selected spice nursery and plantation   Apply management activities for coffee and spice crops   Harvest coffee and spice crops   Discuss processing types of coffee and spice crops.   Work in multidisciplinary approach   Do research independently in various aspect of coffee and spice crops | |
| Course  Descriptions | This course is designed to equip students with the basic principles and  techniques of production, and processing of coffee and major spice crops. It also enables students to equip with improvement and marketing of coffee and spice crops. | |
|  | **Part I Coffee production and processing** | |
| Contact  Content | Chapter | Content |
| Chapter 1 | 1. Introduction  1.1 Origin of coffee  1.2 Values of coffee production to national economy  1.3 coffee in relation with healthy |
| Chapter 2 | 2. Coffee diversity and its improvements  Different species of coffee  Coffee mutants;  Diversity and property of mutants |
| Chapter 3 | 3. Eco-physiology of coffee  3.1 Interaction of coffee with different environment  with its yield and quality  3.2 Shade management |
| Chapter 4 | 4. Coffee propagation |

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|  |  | 4.1 sexual propagation method  4.2 Asexual propagation method |
| Chapter 5 | 5. Nursery and field orchard establishment and  managements  5.1 Site selection  5.2 Site preparation  5.3 Seed preparation and planting  5.4 Nursery and field management (pruning, training, mulching, Watering, fertilizing etc) |
| Chapter 6 | 6. Coffee protection  6.1 Major disease (CBD, CLR, CWD)  6.2 Major insects (Antestia bug)  6.3 weeds that affect coffee |
| Chapter 7 | 7. Coffee processing  7.1 Harvesting methods  7.2 Processing methods (dry and wet)  7.3 Quality issues |
| Chapter 8 | 8 Coffee marketing  8.1 Coffee marketing and supply chain managements  8.2 Coffee grading and auction system |
| **Part II spice crop production and processing** | |
| Chapter 1 | 1. Introduction  1.1. Definition of terms  1.2. Classification of spices |
| Chapter 2 | 2. Global and National Importance of spices and herbs |
| Chapter 3 | 3. Present Status of spice and herbs |
| Chapter 4 | 4. Challenges of productivity and quality of spices and  herbs in Ethiopia |
| Chapter 5 | 5. Production of Spice and herb crops in Ethiopia  5.1.Ecological requirements of spices and herbs  5.2.Agronomic practices  5.3.Breeding and improvement in spices  5.4.Harvesting and postharvest handling  5.4.1. Methods of harvesting  5.4.2. Methods of processing  5.4.3. Value addition in Spices and herbs  5.5.Protection for spices and herbs  5.6.Production techniques for major spices and herbs |
| Chapter 6 | 6. Marketing of spices and herbs  6.1. National Standards  6.2. International Standards |
|  | **Practical**  Identify of morphology of the coffee and selected spice plants, propagation methods of coffee and selected spice crops, preparation of nursery and raising seedlings for |

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coffee and spice crops, establishing coffee and spice plantations, pruning of coffee plants, observation of processing plant for coffee beans and identification of different spices which are available in the market.

**Teaching -Learning Processes**

Interactive lecture, Audiovisual aids and posters,, Group discussion, , Questioning and answering, Tem paper and presentation , lab/practical work

**Assessment methods:**

Evaluation will be carried out based on continuous assessment which comprises:

 Term paper writing and presentation 30%

 Field and lab report 20%

 Final exam 50% **Total 100%**

**References**

 Coste R. 1992. Coffee: The Plant and Products. The Macmillan Ltd. London

 Wrigly G. 1988. Coffee (Tropical Agriculture series). Longman Scientific and Technical Publishers

UK

 Cambrony H.R. Coffee Growing (Tropical Agriculturist). The Macmilan Press Ltd. London

 Girma H/Michael,Degafe Tilahun, Edossa Etissa, Belay Yemanebirhan and Weyessa Daredew. 2008.

Spices Research Achievements. Revised edition. Ethiopian Institute of Agricultural Research. Addis

Ababa, Ethiopia.

 Jansen, P.C.M. 1981. Spices, condiments and medicinal plants in Ethiopia, their taxonomy and agricultural significance

 Haarer, A.E. 1962. Modern Coffee Production. 2d ed. Leonard Hill Books Ltd

**HORT-572 Current Topic in Horticulture Crops 1(0+1) Course Description**

Presentation and discussion of progress in research. Students are required to prepare and present quality

scientific papers addressing advances in horticulture. Topics may be drawn from any current research area in the field of horticulture. Paper topic does not have to be related to the student’s research, as long as there is sufficient content to support a quality paper.

**Course Objectives:**

 Able to extract scientific information from various literature sources

 to develop the skills of organizing information for presentation to the larger audience

 Able to develop scientific paper writing skills

 Able to share his/her knowledge with fellow students

 Able to learn from peer students

**Teaching -Learning Processes**

Graduate seminar presentation will be announced to all interested participants and the candidate is expected to present his/her observations in the seminar on the selected topic related to his field of specialization other than his dissertation research topic. Presentation will be conducted using audio-visual aids like Power-point in a meeting hall for one hour (20 to 25 minutes presentation by the student and 20 to 30 minutes for discussion.

**HORT-531 MSc Thesis Research 6 (0+6)**

The graduate student will undertakes an independent and original research on important and relevant topics to Ethiopian Horticultural system under supervision of a major advisor in the field of Horticulture. The topic and proposal of study is to be determined by the student and the major advisor, and the agreed draft proposal, written as per UoG guidelines, is presented for further improvement with comments and suggestions by team of relevant staffs before conducting the research. Finally the research thesis write-up is submitted, for open defense as a partial requirement for the M.Sc. Degree in Horticulture.