DIPLOMA IN ORGANIC AGRICULTURE

LIST OF COURSES FOR 2 YEAR PROGRAMME

Semester I

DOA 1101	Introductory Agriculture (1+0)
DOA 1102	Introduction to Agronomy (1+1)
DOA 1103	Introduction to organic farming – I (2+1)
DOA 1104	Introduction to Soil Science (1+1)
DOA 1105	Introductory Horticulture (2+1)
DOA 1106	Fundamentals of Plant Pathology (2+1)
DOA 1107	Introduction to Agricultural Entomology (2+1)
DOA 1108	Introduction to Organic Farming - II (2+1)

Semester II

DOA 1209	Soil fertility and nutrient management in organic farming (2+1)
DOA 1210	Organic input production – I (0 +2)
DOA 1211	Organic crop production – I (2 +1)
DOA 1212	Crop Pest Management in Organic Farming– I (2+1)
DOA 1213	Diseases of field crops, vegetables and their organic management (2+1)
DOA 1214	Breeding for Organic Farming (1+1)
DOA 1215	Introduction to organic livestock management (1+1)
DOA 1216	Introduction to Computer Applications in Agriculture (1+1)

Semester III

DOA 1317	Organic input production II (0+2)
DOA 1318	Organic crop production – II (2 + 1)
DOA 1319	Diseases of horticultural crops, and their management (2+1)
DOA 1320	Crop Pest Management in Organic Farming –II (2+1)
DOA 1321	Marketing and farm economy in organic farming (1+1)
DOA 1322	Post Harvest Management in organic fruits and vegetables (1+0)
DOA 1323	Communication and Extension methods (1+1)
DOA 1324	Fundamental of Poultry production and Fisheries (1+0)
DOA 1325	Farm inspection and organic certification (2+1)
DOA 1326	Educational Tour (South India) (0+1)

Semester IV

DOA 1427	Commercial Entomology (1+1)
DOA 1428	Value addition and processing in major crops of Kerala (2+1)
DOA 1429	Nursery techniques (0+2)
DOA 1430	Commercial production of Bio – control agents (0+1)
DOA 1431	Mushroom cultivation (0+1)
DOA 1432	Use and maintenance of Plant protection equipments & Farm implements (0+1)
DOA 1433	Commercial Organic Floriculture (1+1)
DOA 1434	Training – I (0+3)
DOA 1435	Training – II (0+4)

Total credits – 40+ 40= 80

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SYALLABUS FOR 2 YEAR DIPLOMA IN ORGANIC AGRICULTURE

I Semester

DOA 1101 Introductory Agriculture (1+0)

Theory

Agriculture- Importance in India and Kerala- History of agriculture development – Chronology of development of agricultural technology in India – Branches of agriculture - Subsistence and commercial agriculture- Intensive and extensive agriculture- Chronology of agricultural technology development in India- Green revolution- Food security- Agricultural scenario- Soils - Crops- Classification- Major crops of India and Kerala - Major farming systems- Rainfed and irrigated agriculture- Agricultural seasons in Kerala- Basic elements of crop production and animal husbandry- Gender roles in agricultural systems- Agro climatic classification of Kerala- Heritage of agriculture - India and Kerala

References

1. Ahmed, I. (ed.) 1985. Technology and Rural Women: Conceptual and Empirical Issues, ILO London
2. Commonwealth Secretariat. 1996. Women and Natural Resource Management: A Manual for the Asian Region. Gender and Youth Affairs Division, London.
3. Grigg. D.B. 1974. The Agricultural Systems of the World : An Evolutionary Approach. Cambridge University Press, Cambridge.
4. Harlan. J.R. 1992. Crops and Man. American Society of Agronomy & Crop Science Society of America, Madison, WI.
5. Pandey, H.2002. Women in Agriculture. National research centre for Women in Agriculture (ICAR), Bhubaneswar.
6. Randhawa, M.S. 1980-1986. A History of Agriculture in India Vol. I to IV Indian Council of Agricultural Research, New Delhi.

DOA 1102 Introduction to Agronomy (1+1)

Theory

Agronomy – definition and scope – agronomy classification of crops and their importance – major crops of Kerala. Seeds and sowing – seed definition – methods of sowing – seed drills and other implements – transplanting. Vegetative propagation of field crops – spacing. Soil fertility vs soil productivity – organic manures – bio-fertilizers – green manures –Weeds – definition – classification. Crop – weed association and competition – critical stages of crop weed competition. Weed management – methods -Methods of irrigation . Micro irrigation. Cropping pattern – terms and definition – multiple cropping and inter cropping – sequential cropping – crop rotation – catch cropping - cover cropping – strip cropping – trap cropping. Cropping systems in Kerala – multitier cropping system – Rice based cropping systems. Farming system –concepts and types - Integrated farming systems in Kerala.

Practical

Identification of seeds of field crops, crops, fertilizers, manures, pesticides, tools and implements – identification of weeds – seed germination and viability test. Numerical exercises on organic fertilizer requirement, plant population, water requirement.

References

1. Balasubramaniya, P and Palaniappan S.P. 2001. Principles and Practices of Agronomy. AgroBios (India) Ltd. Jodhpur.
2. Reddy T.Y. and Reddy G.H.S. 1995. Principles of Agronomy. Kalayani Publishers. Ludhiana
3. Lenika D 2001. Irrigation and Drainage. Kalayani Publishers. New Delhi
4. Michael A.M. 1998. Irrigation Theory and Practice. Vikas Publishing House Pvt. Ltd. New Delhi
5. Mishra R.D. and Ahamed M. 1996. Manual of Irrigation Agronomy. Oxford and IBH Publishing Company Pvt. Ltd.

DOA **1103** **Introduction to organic farming -1 (2+1)**

Theory

Green revolution-ill effects - Organic farming- history- Concepts-Definition-Basic principles-Need-Benefits and scope- Essential characteristics of organic farming- advantages of organic farming –Organic farming and climate change- Management of organic farming – Barriers in organic farming- Options in organic farming-Components-Organic farming for sustainable agriculture- Food security vis-à-vis organic farming-Organic farming scenario-Organic farming movement –National and regional organic farming centres-Soil health management-Soil and water conservation- Pollution control-Crop rotation- Multiple cropping-Inter cropping- Cover crops-Mulching-Green manuring-green leaf manuring-Biological nitrogen fixation-Organic manures-Bulky and concentrated-Organic recycling-Composting-Vermicomposting-Enrichment of manures-Liquid organic manures-Bio fertilizers-Classification and use-Biodynamic agriculture-Zero budget natural farming.

Practical

Visit to Instructional farm and crop museum and identification of crops. Studies of different soil conservation measures. Visit to research stations and organic farmers' fields to familiarize with various cropping and farming systems. Visit to urban waste recycling unit. Familiarization of Common manures and Bio fertilizers.

References

1. Chonkar, P.K. and Dwivedi,B.S 2004. Organic farming and its implication on India's food security. Feril.News 49(11)15-18,21-28,31&38
2. Palaniappan,S.P and Anandurai,K. 1999. Organic farming- theory and practice, Scientific Pub, Jodhpur.
3. Tandon,H.L.S. 1992. Fertilizers, Organic Manures, Recyclable waste and iofertilizers,FDCO, New Delhi.
4. Yawalkar,K.S, Agarwal,J.P,and Bokdi,S.1984.Manures and Fertilisers,Agrl.Horti. Publishing House, Nagpur.
5. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.

DOA 1104 Introduction to Soil Science (1+1)

Theory

Soil-Definition - components of soil. Rocks and minerals-Formation and classification. Weathering of rocks and minerals. Soil formation and profile development. Properties of soil-physical properties,

chemical properties and biological properties. Soil air-soil water-soil colloids-soil reaction-soil organic matter-Its importance in soil fertility management. Biological nitrogen fixation - Soil acidity-Soil salinity-Soil alkalinity. Soils of Kerala- Soil testing in Kerala

Practical

Identification of rocks and minerals. Description of soil profile. Visit to central soil survey office. Collection and preparation of soil samples. Determination of bulk density, particle density, water holding capacity and porosity. Determination of soil texture. Determination of pH, EC and organic carbon.

References

1. Biswas, T.D. and Mukherjee, S.K. 1987. *Text Book of Soil Science*. Tata McGraw Hill Publishing Co., New Delhi
2. Brady, N.C. 1990. *Nature and Properties of Soils*. 10th Edn, Macmillian Publishing Co. Inc., New York
3. Das.D.K, 1997. *Introductory Soil Science*. Kalyani Publishers, New Delhi.
4. Foth, H.D. and Turk, L. M. 1972. *Fundamental of Soil Science*. 5th Edn. Wiley Eastern Pvt. Ltd., New Delhi
5. Gupta, P.K. 2007. Soil, Plant, Water and Fertilizer Analysis. Published by AGROBIOS (India), Jodpur
6. ISSS, 2002. *Fundamentals of Soil Science*. Published by Indian Society of Soil Science, IARI, New Delhi

DOA **1105 Introductory Horticulture (2+1)**

Theory

Definition and importance of horticulture – important horticulture crops of the state- Area and production. Classification of horticultural crops. Phases of growth and development of horticultural crops. Plantations and other perennial crops – climate, site selection, land preparation. Orchid lay out the planting systems. Tree forms – training and pruning. Plant propagation – types of propagation – advantages and disadvantages of different methods – potting media preparation. Seed propagation – seed bed preparation – pre sowing treatments – sowing and aftercare. Asexual propagation – apomictic embroyos – plant modifications for vegetative propagation. Cuttings and layering different methods – advantages and disadvantages. Budding and grafting – different methods – advantages and disadvantages. Components of Nursery – nursery plants – production unit - sales unit – display area – nursery management. Plant propagating structures – green house – mist chambers. Micro – propagation – steps – involved – methods – advantages and disadvantages –Organic cultivation of fruits and vegetables

Practical

Familiarization of major horticulture crops and garden tools- Propagation of plants through seeds – Preparation of potting mixtures, potting and repotting – Propagation of plants through specialized structures – Propagation of plants through cuttings – Propagation of plants through layering - Propagation of plants through budding – Propagation structures – Visit to commercial nurseries

References

1. Bose T.K., Mitra, S.K. and Sadhu, K 1986. Propagation of tropical and subtrop horticultural crops. Naya Prokash Publications, Calcutta
2. Kumar, N 1990. Introduction to Horticulture, Rajalekshmi Publications, Nagarcoil
3. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.

DOA **1106** **Fundamentals of Plant Pathology (2+1)**

Theory

Plant pathology- Importance of plant diseases- Definition- Objectives- Terminologies in plant pathology- Important plant pathogenic organisms- Fungi, bacteria- virus, phytoplasma, spiroplasma, viroids, algae, protozoa, nematodes, phanerogamic parasites.Diseases due to abiotic causes. Epidemiology of crop diseases – weather factors and their role – temperature, rainfall, relative humidity etc.
Disease assessment –forecasting Principles of crop disease management –General Principles of plant disease management, Plant Quarantine and Inspection, Cultural control, Physical Methods, Biological control , Chemical methods, Integrated plant disease management (IDM) – Concepts, advantages and importance

Practical

Collection and preservation of diseased specimens. Diagnosis and detection of plant diseases, Preparation of Bordeaux mixture, Bordeaux paste and cheshunt compound. Methods of mass multiplication of *Trichoderma* sp and *Pseudomonas* sp. Solarisation for management of soil borne pathogens; Demonstration of physical methods for crop disease management, Familiarization with plant protection equipments.

References

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.
2. Singh R. S. 2001. Introduction to Principles of Plant PathologyOxford & IBHPublishing Co.Pvt. Ltd
3. Agrios, G.N. 2005..*Plant Pathology* Academy Press. New York.

DOA **1107** **Introduction to Agricultural Entomology (2+1)**

Theory

Insects- their characters- legs, wings, mouth parts- Metamorphosis- types. Classification of insects – orders. Pests: definition and categories. Pest outbreaks and threshold levels. IPM – concepts and techniques. Biopesticides- Predators, parasites, pathogens. Common botanical insecticides. Insect pheromones-types and application. Insect growth regulators. Organic pesticides- mode of action- Pesticide act & rule.

Practical

Insect –identification –different types of legs, wings, antennae. Identification of predators and parasitoids. Identification of entomopathogens. Familiarization with cultural control, physical control and mechanical control. Familiarization with different groups of insecticides. Calculation of doses of insecticides and water volume. Organic approaches for pest control. -Types of insect traps.

References

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.
2. David, B. V. and Ramamurthy, V. V. 2016. Elements of Economic Entomology (8th Ed.) Brillion Publishing, 400 p

3. Srivastava, K.P. and Dhaliwal, G.S. 2016. Textbook of Applied Entomology (volume 1 & 2) 2016. Kalyani Publishers.

DOA 1108 Introduction to Organic Farming - II (2+1)

Theory

Regenerative organic farming-Organic farming and biodiversity-Organic crop production practices-General Guidelines-Eco-friendly pest management-Integrated farming system models- Value addition for organic products- Quality of organic products- Bioremediation- Ecotourism- Standards for Organic farming- Farm inspection and certification- GAP certification and organic certification- Sustainable agriculture- goal- current concepts- factors affecting sustainable agriculture- Agriculture sustainability by ecological, economical and social means- land, water and crop production related problems and its management for sustainable agriculture - ITK in organic farming – Aquapounics method of cultivation

Practical

Familiarization of bio pesticides-Visit to various integrated farming system models – Visit to certified organic farms-Collection and submission of ITK in organic farming

Reference

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.

II Semester

DOA 1209 Soil fertility and nutrient management in organic farming (2+1)

Theory

Soil fertility and productivity- concepts- history and development- essential plant elements- Functions- Deficiency and toxicity symptoms- Nutrient cycles- Soil health- Concept and assessment- Management- Soil health card- Micro organisms and Macro organisms in soil fertility- Organic matter in soil fertility- Decomposition of organic matter- Soil fertility evaluation- Different techniques- Soil test based nutrient recommendation to organic crops- Organic manures- Bulky- FYM- Green manures- Compost- Various methods of composting- Vermicompost- Coir pith compost Bio gas slurry- Concentrated organic manures- Oil cakes- Fish meal- Meat meal- bone meal etc.- Use of agro-industrial waste- Crop residue management- Naturally occurring mineral amendments- Liquid organic manures- Biological nitrogen fixation- INM and IPNM

Practical

Principles of analytical instruments and their calibration and application. Collection and preparation of soil samples for soil analysis. Analysis of important physical, chemical and biological properties of soil. Detection of N,P,K deficiency in plant sample by rapid tissue testing

References

1. Das P.C. (1998). Manures and fertilizers. Kalyani publishers, New Delhi
2. Tandon, H.L.S. 1992. Fertilizers, Organic Manures, Recyclable waste and biofertilizers, FDCO, New Delhi.
3. Tisdale, S.L., Nelson, W.L, Beaton, J.D. and Havlin, J.L. (1997). Soil fertility and fertilizers, Prentice Hall of India Pvt. Ltd. New Delhi.
4. Yawalkar,K.S, Agarwal,J.P,and Bokdi,S.1984.Manures and Fertilisers, Agrl.Horti. Publishing House, Nagpur.

DOA 1210 Organic input production – 1 (0 +2)

Practical

Organic farming –components – organic manures- composting - different methods -vermicomposting - different production technologies- enriched vermicompost-coir pith composting- N A D E P composting- production of liquid organic manures- vermiwash- jeevamritham,beejamrith,panchagavya etc-bio gas technology- EM compost-biodynamic compost-green manure crop raising- azolla production - specifications of organic manures- Bio fertilizers- specifications-methods of application of organic manures and biofertilisers-analysis of nutrient content and organic carbon content of organic manures

References

1. A.K. Dahama, 2003. Organic farming for sustainable agriculture, Agrobios, Jodhpur
2. A.K. Sharma.2003. A Handbook of organic farming
3. Gaur, A.C., Neelakantan,S and Dargan, K.S, 1984. Organic Manures, I C A R
4. G O I.2003. Guidelines for organic farming Ministry of Agriculture and Corporation Govt. of India, New Delhi.
5.KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2^{nd} Ed.). Kerala Agricultural University, Thrissur, 328p.

DOA 1211 Organic crop production – 1 (2 +1)

Theory
(Rice, vegetables, fruits and tuber crops)

Organic production technology of rice- origin - area & production, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices, harvest and post harvest handling, and value addition of rice. Organic Production technology of warm season vegetable- Importance, origin, taxonomy, varieties, cultivation, problems and prospects for Solanaceous crops- tomato, brinjal and chilli- Cucurbits- bitter gourd, snake gourd, cucumber, melons, pumpkins, ash gourd, bottle gourd, ridge gourd, smooth gourd, watermelon, other perennials. Leguminous crops- vegetable cow pea, winged bean and other minor crops, okra, Leafy vegetables- amaranthus, basella, chekkurmanis organic production technologies of cool season vegetables- Organic produton technologies of banana and pineapple-Organic production technology of tuber crops- tapioca, sweet potato, yams and other minor tubers – protected organic cultivation in poly house.

Practical

Identification and familiarisation of rice, vegetables and tuber crops– - familiarization of seeds and planting materials - Preparation of wet, dry and mat nurseries for rice –Calculations on seed rate, manure requirements – Organic cultivation of rice,vegetables fruits and tuber crops- Preparation of organic planting material of major crops - Seed treatment – Land preparation and planting – After cultivation operations – Growth and yield measurements – Harvesting – Computation of cost of cultivation – Layout of organic nutritional garden-visit to commercial protected organic cultivation in poly house

Reference

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.

DOA 1212 Crop Pest Management in Organic Farming–I (2+1)

Theory

Pests of rice, plantation crops (coconut-arecanut--cashew), vegetables (chilli, brinjal, tomato, bhindi, cowpea, amaranthus, cool season vegetables), fruits (mango,banana, citrus), spices (cardamom, pepper, turmeric and ginger) and their management by organic means

Practical

Familiarization with pests of rice, plantation crops, vegetables, fruits, spices. Collection of crop pests and submission.

References

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.
2. Atwal, A. S. and Dhaliwal, G. S. 2003. *Agricultural Pests of South Asia and their Management.* Kalyani Publishers, 498 p.

3. Nair M.R.G.K. A Monograph on crop pest of Kerala. Kerala Agricultural University

DOA **1213** **Diseases of field crops, vegetables, fruits and their organic management (2+1)**

Theory

Symptoms, etiology, disease cycle and management of major diseases of following crops:

Field crops
Rice, Wheat, Sugarcane ,Cotton: Groundnut: Pea: Pigeonpea: Black & green gram:

Vegetable Crops:
Cruciferous vegetables: Potato: Brinjal: Tomato: Chillies: Okra: Beans, cowpea: Tapioca: Colocasia, Yams, Amorphophallus: Cucurbits: Onion and garlic: Amaranthus& leafy vegetables:

Fruit crops:
Banana and pineapple

Practical
Identification and histopathological studies of selected diseases of field and vegetable crops covered in theory.

References

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.
2. Rangaswamy. G1988.. Disease of crop plants in India. Prentice Hall of India. New Delhi
3. Gupta, V.K.and Paul, Y.S.2001. *Diseases of Vegetable Crops*.Kalyani Publishers, New Delhi -110 002
4. Peethambaran, C.K., Girija, V.K., Umamaheswaran, K., and Gokulapalan,C.2008. *Diseases of Crop plants and their management*. Kerala Agricultural University.

DOA 1214 Breeding for Organic Farming (1+1)

Theory

Introduction to organic breeding- concept of naturalness –Organic Plant Breeding: -current practical and scientific challenges ,comparison of conventional and organic crop varieties- guidelines for organic plant breeding methodology -organic crop ideotype- plant breeding techniques for raising organic crops- different breeding objectives, selection criteria, selection strategy- assessment of socio-economic and legal conditions-study of agronomical and physiological aspects of organic crops – aspects on pest and disease resistance, breeding for quality aspects- organic seed production-participatory plant breeding techniques –Certification for produces and seeds-Intellectual property rights

Practical

Study of different breeding techniques- studies of variability parameters – correlation studies- screening for agronomic and physiological characters- pest and disease resistance studies- organic seed production

Reference

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.

DOA **1215** **Introduction to organic livestock management (1+1)**

Theory

Introduction : - Role of live stocks in organic agriculture-Integrating animals in the farm-planning –care and management of livestock-organic standards in animal husbandry N P O P conversion period- - housing-feeding animal-a balanced diet-organic fodder cultivation- organic milk production - grazing and -management of pastures-animal health and welfare -veterinary treatment-breeding in organic animal husbandry-economic consideration-organic certification – organic livestock records. - quality control and certification procedure of animal based organic products. Production and marketing of animal excreta based organic products useful for organic agriculture.

Practical

Visit to dairy farm- practice feeding and management of livestock - hand milking of animals - computation of cost - benefit ratio-project preparation for finance- Production and marketing of animal excreta based organic products useful for organic agriculture - fodder production with organic inputs.

Reference

1. GO I.2003. Guidelines for organic farming Ministry of Agriculture and Corporation Govt. of India, ND.
2. F O A M Training manual for Organic Agriculture in the Tropics-

DOA **1216** **Introduction to Computer Applications in Agriculture (1+1)**

Theory

Introduction to Computer fundamentals, Input and Output Devices. Units of Memory, Hardware, Software and Classification of Computers Types of Processors, Computer Viruses, Worms and Vaccines. Operating system – WINDOWS and Malayalam softwares.
Word Processing packages, Features of Word Processing, Electronic Spreadsheets, Concept, Packages, Creating, Editing and Saving a Spreadsheet. Concept of Database, Units of Database, Creating Database. Presentation packages, Features of presentation. Internet: Applications, Web browsing and electronic mail, Mobile phone applications, android. e-learning, e-library, search engines.

Practical

Study of Computer Components, Booting of Computer and its shut down. Use of Mouse, Title Bar, Minimum, Maximum and Close Buttons, Scroll Bars, Menus and Tool Bars. WINDOWS Explorer, Creating Folders, Copy and Paste functions. MS Word: Creating a document, saving and editing. Use of Options from Tool bars, Format, Insert and Tools (Spelling and Grammar), Alignment of text, Creating a table, merging of cells, Column and row width, inserting column, row and a cell – MS Excel - Entering expressions through the Formula Tool Bar and use of inbuilt functions, SUM, Average, Subtraction. MS Access – creation of tables - MS Power point: Preparation of Slides on Power point, Transforming the data of Word, Excel and power point. Internet Browsing: Browsing a Web page and Creating of E-mail ID.

III Semester

DOA 1317 Organic input production II (0+2)

Practical

Preparation & use of liquid organic manures – Vermi wash, panchayagvya, dasagvya, Jeevamritham, beejamrith , fish jiggery mixture, egg amino acid etc. - Organic inputs for plant protection-biopesticides and biocontrol agents-preparation of different botanicals-leaf extracts- bio control agents- method of mass multiplication of trichoderma and pseudomonas – microbial pesticides for pest control - applications of different organic inputs-viz. organic manures, liquid organic manures,biofertilisers and biopesticides

Reference

1. A.K. Dahama, 2003. Organic farming for sustainable agriculture, Agrobios, Jodhpur
2. A.K. Sharma.2003. A Handbook of organic farming
3. Gaur, A.C., Neelakantan,S and Dargan, K.S, 1984. Organic Manures, I C A R
4. G O I.2003. Guidelines for organic farming Ministry of Agriculture and Corporation Govt. of India, New Delhi.
5.KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2^{nd} Ed.). Kerala Agricultural University, Thrissur, 328p.

DOA 1318 Organic crop production – II (2 + 1)

Theory

(Spices, Plantation crops, Medicinal and Aromatic plants, Fodder and Forage crops, Agro forestry system)

Plantation crops -Introduction - importance – area, production – origin, distribution – varieties – climate, soil, site selection – propagation, production of quality planting materials and hybrids – nursery management – layout, planting, aftercare – irrigation, manuring – stage of harvest, harvesting, yield and uses of coconut and arecanut. Origin – distribution – area, production – varieties – climate, soil – propagation, nursery management – site selection, layout, planting – crop management including manuring, irrigation, shade regulation, harvesting, yield of pepper, cardamom, ginger, turmeric, cinnamon, nutmeg, clove and allspice. Brief study of the history, importance and scope of medicinal and aromatic plants, management of nurseries, soil and climatic requirement, land preparation, intercultural practices and harvesting of Rauvolfia, Catharanthus, acorus, neem, Kaempferia, long pepper, Plumbago, Indigofera and ocimum. History, importance, problems and scope of cultivating aromatic crops, cultivation, active principles and uses aromatic grasses (lemon grass, palmarosa, citronella, vetiver).

Practical

Production of quality planting materials. Seedling selection. Familiarization with varieties, Moisture conservation methods in plantations. Organic cultivation of spices, medicinal and aromatic plants ,fodder crops-Layout and planting, care and management of plantations.

Reference

Atal.C.K. and Kapur.B.M. 1982. Cultivation and utilization of medicinal plants. RRL, CSIR, Jammu.Tawi.
Balasimha, D and Rajagopal, V. 2004. Arecanut, CPCRI, Kasargod, Kerala.

Kurian, A and Sankar, M.A.2007. Medicinal Plants. New India Publishing Agency, New Delhi.
Nampoothiri,K. U. K and Singh, H. P. 2000 Trends in Coconut Research and Development in India, Coconut Development Board, Kochi.
Nybe, E.V, Mini Raj,N and Peter, K.V.2007. Spices. New India Publishing Agency, New Delhi.
KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.

DOA 1319 Diseases of horticultural crops, and their management (2+1)

Theory

Symptoms, etiology, disease cycle and management of major diseases of following crops:
Coconut, Arecanut, Oilpalm, Cocoa, Rubber, Cardamom, Pepper, tree spices, Ginger, turmeric, Vanilla, Banana, Mango, Cashew, Jack, Sapota, Guava, Grapevine, citrus, Papaya, Apple
Rose, Jasminne, Orchids,Anthurium

Practical

Identification and histopathological studies of selected diseases of field and vegetable crops covered in theory.

Reference

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.
2. Rangaswamy. G1988.. Disease of crop plants in India. Prentice Hall of India. New Delhi
3. Peethambaran, C.K., Girija, V.K., Umamaheswaran, K., and Gokulapalan,C.2008. *Diseases of Crop plants and their management*. Kerala Agricultural University.

DOA 1320 Crop Pest Management in Organic Farming –II (2+1)

Theory

Pests of sugarcane, cotton, tuber crops (tapioca, sweet potato, yams etc) and their management. Pest of stored materials and their management. Non-insect pests in crops(mites, rats, rodents, Nematode) and their organic management

P**ractical**

Familiarization with pests of sugarcane, cotton, tuber crops (tapioca, sweet potato). Identification of Pest of stored materials-Non-insect pests in crops(mites, rats, rodents, Nematode) Collection of pests and submission.

Reference

1. KAU (Kerala Agricultural University) 2017. *Package of practices recommendations (Organic) crop*s (2nd Ed.). Kerala Agricultural University, Thrissur, 328p.
2. 1.Atwal, A. S. and Dhaliwal, G. S. 2003. *Agricultural Pests of South Asia and their Management.* Kalyani Publishers, 498 p.
3. 2. Nair M.R.G.K. A Monograph on crop pest of Kerala. Kerala Agricultural University

DOA 1321 Marketing and farm economy in organic farming (1+1)

Theory

Organic farming-Organic marketing-global review-opportunities and constraints marketing channels and agencies - new opportunities in growing market- organic farmers- domestic and export market-certification of organic products –organic food certification in India- economic viability in organic farming- computation of cost benefit ratio-benefits for farmers-employment generation-rural and community development- optimizing recycling-minimizing external inputs - reducing workloads quality organic products-value addition in the farm- premium prices-Govt. schemes and other financial resources

Practical

Computation of benefit cost ratio - visit to certain organic outlets -project preparation for financial assistance- conducting field days etc. – entrepreneurship development programme

Reference

1. I F O A M Training manual for Organic Agriculture in the Tropics- FiBL2002
2. A.K. Dahama, 2003. Organic farming for sustainable agriculture, Agrobios, Jodhpur
3.. A.K. Sharma.2003. A Handbook of organic farming

DOA 1322 Post Harvest Management in organic fruits and vegetables (1+0)

Theory

Introduction to post harvest technology of fruits and vegetables- Current Indian and Kerala scenario of post harvest sector- Importance of post-harvest handling. Changes during maturity and ripening; Factors leading to post harvest losses- Pre harvest factors affecting quality and shelf life - Harvest indices, harvesting methods- Pre-cooling- Types, importance, methods etc. Pre- Treatments prior to shipment- Packaging techniques- Standards and specifications for fresh produce. Principles and methods of storage- Low cost storage structures - Storage disorders- Principles of transport -Modes of transportation-Marketing systems and organisations.

DOA 1323 Communication and Extension methods (1+1)

Theory

Communication – definition. Communication process and key elements. Levels of communication – Public speaking – types, Scientific writing and data presentation. Adoption – stages and adopter categories. Extension Teaching – methods. Classification Group contact method. Mass contact method. Audio visual aids and classification. Farm journalism – news stay and leads. Effective writing technique. Radio talk, TV talk. ITK in communicating rural people. Programme planning, peoples participation. Management in extension organizational Expert system in agriculture – e-learning. Publication related to extension work. Distance education.

Practical

Conducting method demonstration. Preparation of leaflet/folder. Preparing news Preparing script for radio. Preparing script for television. Visit to Television channel office. Handling of mutli-media tools. Visit to newspaper office. Preparation of poster. Visit to Agri portal centre. Preparation of different types

of charts. Information sources for farmer. Conducting exhibition conduct of training programme. Visit video production unit. Visit to video/audio conference lab.

DOA **1324 Fundamentals of Organic Poultry production and Fisheries (1+0)**

Theory

Poultry – definition – poultry production in India-common terms in poultry science-introduction of systems of poultry – chicks/quail/emu rearing – deep litter-cage and backyard systems. Brooding and rearing of chicks-rearing of growers and layers-broiler rearing. Common disease-symptoms and prevention in poultry-bacterial-coryza-salmoncellosis-viral-ranikhet disease-infections bursal disease-protozoan-coccidiosis-. Organic control of pest and disease . Familiarization of organic poultry production – organic egg and poultry meat production -Aquaculture – ornamental fisheries – breeds of fishes – feeding breeding – care and management control and prevention of important diseases by organic means.

DOA **1325 Farm inspection and organic certification (2+1)**

Theory

Organic farming guidelines- NPOP-operational structure of NPOP– organic certification need - certification in India- certification in Kerala- Accreditation agencies in India- Certification agencies in India- National and International organic production standards- certification requirements - conversion requirements- buffer zones – crop production standards- permitted substance for use in soil fertility-permitted substances for pest and disease - animal husbandry standards- HACCP-list of approved additives and processing aids of non organic origin for post harvest processing food processing, handling and post harvest storage -procedure of farm certification- documentation and documentation control-development of Internal control system – Third party verification- procedures of inspection – India Organic Logo trademark – PGS certification – operational structure of PGS – procedure of PGS certification – GAP certification- guidelines

Practical

Visit to Indocert – visit to certified organic farm- visit to organic input units etc.

Reference

1. I F O A M Training manual for Organic Agriculture in the Tropics- FiBL2002
2. A.K. Dahama, 2003. Organic farming for sustainable agriculture, Agrobios, Jodhpur
3. A.K. Sharma.2003. A Handbook of organic farming

DOA 1326 Educational Tour (South India) (0+1)

To familiarize the students with various crops with and activities of different agricultural universities, research institutes, Government and private organizations, Agro Industries etc in different parts of South India. (15 days duration)
* non gradial course

IV Semester

DOA 1427 Commercial Entomology (1+1)

Theory

Economic insects-honey bees types and rearing. Economic insects- sericulture and other beneficial insects. Scope and prospectus of beekeeping. Bee keeping equipment. Species and races of bees, bee hive and its characterization. Bee castes, biology. Beekeeping for pollination- role of honey bees in pollination. Pests and diseases of honey bees. Guidelines on organic honey production - Study of different species of silkworms, characteristics features, host plants and their cultivation. Rearing and management of silkworms, appliances. Pest and diseases of silk worms.

Practical

Familiarization of different models of bee hives and honey extraction with extractor. Identification of honey bee species, bee castes. Identification and handling of beekeeping equipments. Familiarization of bee pasturage, identification of pest & diseases of bee. Honey extraction and processing, methods of extraction of other hive products. Silk worm-identification of different species, rearing and management. Identification of pests and diseases of silk worms, host range identification.

Reference

1. Ghosh G.K. Bee Keeping in India. 1994. APH publishers
2. Mishra R.C.2013.Honeybees and Their Management in India . Indian Council of Agricultural Research, New Delhi

DOA 1428 Value addition and processing in major crops of Kerala (2+1)

Theory

Introduction to value addition-.Present status and future prospects - Indian and global scenario. Spoilage of fresh and processed produce, Changes and enzyme associated with spoilage- Principles and importance of value addition. Primary processing- Processing equipments- Layout and establishment of processing industries acquiring FSSAI registration/ licence. Methods of preservation by heat, drying, chemicals, irradiation, freezing, fermentation, etc. - Food additives- classification and functions- Important value added productsfrom fruits, vegetables, cereals, tubers, pulses, spices and plantation crops. Utilization of by products - Waste management in processing factory

Practical

Preparation and evaluation of various processed products from fruits, vegetables, cereals, tubers, pulses, spices and plantation crops.- Beverages, pickles, sugar based products, tomato products, snacks, fermented products etc as per food laws and standards- waste utilization- Sensory evaluation of fresh and processed products.

Reference

1.Mitra S.K. 1997 post harvest physiology and storage of Tropical Fruits C A B International U.K.
2. Panastico B.M 1975. Post harvest physiology handling and utilization of tropical and sub-tropical fruits and vegetables. The AVI publishing Company, I N C

DOA 1429 Nursery techniques (0+2)

Practical

Components of nursery-nursery implements. Nursery structure. Potting mixture preparation and potting. Seed bed preparation, sowing and after care. Propagation with cuttings. Propagation through different methods of layering. Budding, grafting. Care and management of nursery plants - visit to commercial nursery

DOA 1430 Commercial production of Bio – control agents (0+1)

Practical

Introduction and familiarization of important bio-control agents for crop disease management, pest management – Acquaintance with laboratory equipments –preparation of media for isolation and pure culturing of Trichoderma and Paseudomonas – Isolation of bio-control agent – Pseudomonas fluorescens , Trichoderms – Pure culturing and Mass production of Pseudomonas and Trichoderma – small scale production - mass production using fermentor – Quality testing of formulated products – Mass production of Trichogramma, Verticillium and Beuveria – preparation of trichocards

DOA 1431 Mushroom cultivation (0+1)

Practical

Equipments used in mushroom laboratory – physical and chemical sterilization techniques – preparation of culture media – techniques – isolation of different mushrooms in pure culture – preparation of spawn – mother spawn and bed spawn – preparation of substrates mushroom cultivation – Visit to a commercial spawn production unit – paddy straw mushroom cultivation – Milky mushroom cultivation – visit to commercial mushroom production unit – identification and management of different pests and diseases of mushroom – methods of harvesting of mushroom – post harvest treatment and preservation of mushrooms – packaging and processing of mushrooms – different methods of processing – canning and dehydration – design and layout of mushroom farm – cost analysis of mushroom farm and preparation of projects

Reference

Kaul T N., and Dhar B L. Biology and cultivation of edible mushroom. Westville Publishing House, New Delhi

DOA 1432 Use and maintenance of Plant protection equipments & farm implements (0+1)

Practical

Familiarization of plant protection equipments. Repair and maintenance of plant protection equipments. Precaution and measures in handling of plant protection chemicals. Preparation of Bordeaux mixture and Bordeaux paste-- botanical pesticides. Calculation of pesticide formulations. Methods of application of fungicides – insecticides and weedicides. Different bio-control agents and methods of application. Demonstration of working of different types of sprayers. Safety measures in handling pesticides. Study of workshop tools – study of hand tools and manual soil working implements- study of tractor operator cultivator – Operation of paddy thresher – study of combine harvester – operation of brush cutter – Visit to farm implements & farm machinery manufacturing centre.

DOA **1433** **Commercial Organic Floriculture (1+1)**

Theory

Scope of floriculture. Varieties – propagation – cultivation and post harvest handling of orchids – anthuriums – rose jasmine – gerbera – chyanthenmeum – gladiolus – tube rose – carnation – heloiconia – alpinia – crossandra – marigold and other annual flowers. Value addition of flowers. Protected cultivation. Landscape designing and preparation of landscape plan. Classification and production of garden plants. Establishment and maintenance of lawn. Production of potted plants. Establishment and maintenance of gardens. Indoor gardening.

Practical

Identification of garden plants- propagation of garden plants. Plant propagation and management practices of orchids – anthuriums – rose-jasmine –chrysanthemeum – gerbera-heliconia alpinia and other annuals. Plant propagation and management practices of foliage plants. Post harvest handling of cut flowers. Production of dry flowers. Visit to commercial production units of anthurium – orchids. Visit to homestead cultivation of orchids and anthurium. Visit to flower markets. Preparation of landscape designs. Establishment of model ornamental garden. Establishment and maintenance of lawns. Establishment of indoor gardens

DOA 1434 Training – I (0+3)

Students will give special training on the following modules

1. Certified Organic Farm
2. Krishi Bhavan
3. SHG/NGOs
4. Apiculture

DOA 1435 Training – II (0+4)

Students will give special training on the following modules

1. Waste Management
2. Organic seed production technology
3. Farm planning and project preparation
4. Establishment of Commercial organic input production unit
5. Entrepreneurship development programme

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