

SUBJECT CODE-AG 201

Introductory Nematology and microbiology Theory Credit: 4(3+1)

UNIT-1.

Introduction, Nematodes, habitat and diversity History of Phytonematology early and modern history, Land Mark historical events. Economic importance of plant parasitic nematodes and their general characteristics.

UNIT 2-. History of Microbiology. Spontaneous generation theory and germ theory Protection against infection. Applied areas of microbiology and fermentation

II. Applied areas of microbial metabolism

1. Microbial ATP generation through different metabolical pathways – glycolysis, Embden-Meyerhop pathway, pentose cycle, Entner-Doudoroff pathway

UNIT 3- Bacteriophages Structure and properties of bacterial viruses (bacteriophages), existence of bacteriophages-lytic and lysogenic phages/cycles
Some specific forms of viruses – viroids and prions

UNIT-4 Nematode general morphology and biology shape size, body organization and Symmetry. Outer body wall (Cuticle, Hypodermis, Musculature).Alimentary canal (Inner body tube) male and female reproductive systems, Nervous and excretory systems.

UNIT-5 Biology of nematode life cycle, Embryo-genesis, hatching, moulting, feeding reproduction and biological races. Microbes important in foods Principles of food preservation – heat treatment, low temperature preservation, drying, preservation by additives Microbial spoilage of foods – thermophiles and mesophilic organisms.

Practical

1. General instructions: Familiarization with laboratory microbiological instruments materials, glassware etc.
2. Practice of aseptic methods: Evaluation of aseptic technique with nutrient agar plate.
3. Evaluation of aseptic technique with nutrient broth tubes
4. Introduction and equipments used in phytonematology.
5. Sampling methods, collection of soil and plant samples.
6. Isolation of bacteria by streak plate method
7. Extraction of nematodes by cobb's sieving and decanting methods and

References

1. Agricultural Microbiology – Rangaswami and Bhagyaraj
2. Soil Microbiology – N.S. Subbarao

3. Agricultural Microbiology – N. Mukherjee and T. Ghosh
4. Biofertilizers – L.L. Somani, S.C. Bhandari, S.N. Saxena
5. Introduction to Soil Microbiology – M. Alexander
6. An Introduction to Microbiology – P. Tauro, K.K. Kapoor and
7. Introductory Nematology - R.K. Walia and H.K. Bajaj
8. Plant Nematology - Pathak and B.S. Yadav

SUBJECT CODE-AG 202

Water Management including Micro irrigation Theory Credit: 4(3+1)

UNIT 1- Irrigation: Definition and objectives Water resources and irrigation development in India and M.P. Soil-Plant-Water relationships Methods of soil moisture estimation, evapo-transpiration and crop water requirement

UNIT 2- Effective rainfall, scheduling of irrigation. Methods of irrigation (Surface, sprinkler and drip irrigation)

UNIT 3- Irrigation efficiency and water use efficiency Conjunctive use of water

UNIT 4- Irrigation water quality and its management Water management of rice, wheat, maize, groundnut,

UNIT 5- sugarcane, Wheat, rice, mango, Banana and tomato. Agricultural drainage

Practical

1. Determination of bulk density by field method
2. Determination of soil moisture content by gravimetric method, tensiometer, electrical resistance block, neutron moisture meter
3. Determination of field capacity and wilting point
4. Measurement of irrigation water through flumes and weirs
5. Calculation of irrigation water requirement
6. Determination of infiltration rate
7. Demonstration of furrow method of irrigation
8. Demonstration of check basin and ring basin method
9. Visit to farmers' field and cost estimation of drip irrigation system
10. Demonstration of filter cleaning, fertigation, injection and flushing of laterals
11. Erection and operation of sprinkler irrigation systems
12. Measurement of emitter discharge rate, wetted diameter and calculation of emitter discharge variability

References

1. Irrigation - Theory and Practices - Michael, A.M.
2. Water Management - Principles and - Singh, R.A. and Singh, S.R.C.Practices
3. Engineering - Michael, A.M. and Ojha, T.P.(1996), Vol. II, Jain Publication
4. Introduction to Agronomy, Soil and - Vaidya,V.G.and Sahatrabudhe,Water Management K.R.
5. Irrigation and Drainage - Lank, D., Kalyani Publisher,
6. Manual on Irrigation Agronomy - Ahmed, M. and Mishra, R.D. (1987), Oxford and IBH Publication, New Delhi.

SUBJECT CODE-AG 207

Principles of Agricultural Economics Theory Credit: 2 (2+0)

UNIT 1. Meaning, Definition, Subject Matter Division of Economics, Importance of Economics Meaning, Definition of Agricultural Economics Basic concept-Goods, Service, Utility, Value, Price, Wealth, Welfare

UNIT 2. Wants : Classification and Characteristics Theory of consumption Law of diminishing marginal utility – meaning, definition, assumption, limitation and importance

UNIT 3. Consumer surplus – Meaning, definition, importance Demand –meaning, definition, kinds of demand, demand schedule Demand Curve, Law of demand Extension and contraction v/s increase and decrease in demand

UNIT 4. Elasticity of demand, type of elasticity of demand. Degrees of price elasticity of demand, methods of measuring elasticity. Factors influencing elasticity of demand, importance of elasticity of demand.

UNIT 5. Public finance – Meaning, Principles Public resource – Meaning Service tax – Meaning. Classification of Taxes – Cannons of taxation Public expenditure – Meaning, principles Inflation – Meaning, definition, kinds of inflation

References

1. Elements of Economic Theory – K.K. Dewett and J.P. Verma
2. Indian Economy – S.K. Mishra and V.K. Puri, Himalayan Publication Pvt. Ltd., New Delhi
3. Fundamentals of Agricultural Economics – K.N. Sandhu & Amarjeet Singh, Himalayan Publication Pvt.Ltd., New Delhi.
4. Agricultural Economics – S. Subba Reddy and P.Raghuram, Oxford and IBH Publication Co. Pvt. Ltd., New Delhi
5. An Introduction to Agricultural Economics – Bilgrami

SUBJECT CODE-AG 203

Dimensions of Agricultural Extension Theory Credit: 4(3+1)

UNIT 1. Meaning and Definition of Education, Formal, Informal and Non-formal education and their characteristics Meaning, definitions, concept, objectives of Extension Education/Agricultural Extension, Principles of Extension Education

UNIT 2 Meaning, definition and concept of Rural Development, Objectives of Rural Development. Importance of rural development, Problems in rural development

UNIT 3. Development programmes of pre-independence era Shriniketan and Marthandam Project Gurgaon Project and Gandhian Constructive Programme
Development Programmes of post-independence era Etawah-Pilot Project and Nilokheri Experiment Project

UNIT 4. Community Development Programme – Meaning, definition, concepts, philosophy, principles and objectives Differences between community development and extension education National Extension Service – Meaning and objectives

UNIT 5. Panchyati Raj System – Meaning of democratic decentralization of power, Three tiers of Panchyati Raj System,. Organizational setup. Powers, Functions of Panchayati Raj System.

Agriculture Development Programme with reference to year of start, objectives and salient features

. Intensive Agricultural District Programme (IADP), High Yielding Varieties Programme (HYVP). Agricultural Technology and Management Agency (ATMA)

Practical

1. Visit to Village and Kisan Mandal to study the ongoing development programmes
2. Visit to Panchayati Raj Institutions to study the functioning of Gram Panchayat (GP), Janpad Panchayat (JP) and Zila Panchayat
3. Visit and study the District Rural Development Agency (DRDA)
4. Participation in monthly workshop of Training and Visit System (T & V system)
5. Visit to Watershed Development Project Area
6. Visit to a village to study the Self Help Groups (SHGs) of DWCRA

7. Visit to a voluntary Organization to study the development activities
8. Organizing PRA techniques in a village to identify the agricultural problems

References

1. Extension Education in Community – Directorate of Extension, Development Ministry of Agriculture, Govt. of India
2. Education and Communication for Dhama, O.P. and Bhatnagar, Development O.P. Oxford and IBH Publicity Co. New Delhi
3. An Introductory of Agricultural Extension – Mosher, A.T.
4. Extension Communication and Management - Ray G.L., Naya Prakashan 206 Bidhan Sarani, Calcutta-6
5. Rural Development – Principles, Policies and Management – Singh, Katar, Sage Publications, New Delhi
6. Dimensions of Agriculture Extension – Singh, A.K. and K. Roy Burman, Aman Publication, Merut

SUBJECT CODE-AG 204

Introduction to Computer Applications Theory Credit: 4 (3+1)

UNIT 1- Introduction to Computers Input and output Devices, Units of Memory. Hardware, Software and Classification of computers. Types of Processors.

UNIT 2- Operating System – DOS and DOS commands
Operating system WINDOWS and its elements MS-WORD, features of word processing. Creating, Editing document in word MS-EXCEL-Electronic spreadsheet, concept.

UNIT 3- Use of Data Analysis tools, correlation and Regression
Entering expressions, creating graphs t-test for two samples and ANOVA with one way classification Introduction to MS Power Point, Creating new presentation, power point views

UNIT 4- Introduction to MS Access, concept of data base, creating data base Creating tables in data base Principles of programming.

UNIT 5- Introduction to Internet World wide web, information retrieval Introduction to electronic mail Advantages of E-mail

Practical

1. Study of computer components
2. Practice of DOS commands
3. Practicing windows operating system
4. Creating folders, copy and paste
5. Creating a document, saving and editing
6. Formatting documents
7. Creating a table, merging of cells
8. Creating spread sheet and formatting
9. Creating Graphs in MS Excel

References

1. Microsoft DOS – Peter Norton’s Techmedia
2. Microsoft Office – Complete reference – BPB publication

SUBJECT CODE-AG 206

Soil Chemistry, Soil Fertility and Nutrient Management Theory Credit: 4(3+1)

UNIT 1- Soil as a source of plant nutrients. Essential and beneficial elements, criteria of essentiality. Forms of nutrients in soil, mechanisms of nutrient transport to plants.

UNIT 2- Factors affecting nutrient availability of N to plants and Nitrogen use Functions of P and measures to overcome deficiencies and toxicities Factors affecting nutrient availability of P to plants and Phosphorus use.

UNIT 3- Functions of K and measures to overcome deficiencies and toxicities Factors affecting nutrient availability of K to plants and Potash use efficiency (PUE) Functions of S and measures to overcome deficiencies and toxicities

UNIT 4- Factors affecting nutrient availability of S to plants and sulphur use efficiency (SUE) Functions of Ca and Mg and measures to overcome deficiencies and toxicities Factors affecting nutrient availability of other Ca and Mg to plants

UNIT 5- Factors affecting nutrient availability of Fe to plants and Iron use efficiency (IUE) Functions of Zn and measures to overcome deficiencies and toxicities. Factors affecting nutrient availability of Zn to plants and Zinc use efficiency (ZUE) Problem soils – acid, salt affected and calcareous soils, characteristics,

Practical

1. Principles of analytical instruments and their calibration and applications, Colorimetry and flame photometry
2. Estimation of available N in soils
3. Estimation of available P in soils
4. Estimation of available K in soils
5. Estimation of available S in soils
6. Estimation of available Zn in soils
7. Estimation of pH and EC in soil water extracts
8. Estimation of Soluble cations in soil water extracts
9. Estimation of Anions in soil water extracts
10. Estimation of Lime requirement in acidic soil
11. Estimation of Gypsum requirement in alkali soils

References

1. Soil Fertility and Fertilizer – Samuel Tisdale & Werner nelson
2. Introductory Soil Science – D.K. Das
3. Manures and Fertilizers – K.S. Yawalkar, J.P. Agrawal and S.Boks

SUBJECT CODE-AG 205

Principles of Plant Breeding Theory Credit: 4 (3+1)

UNIT 1- Classification of plants, botanical description, floral biology, emasculation and pollination techniques in cereals, millets, pulses, oil seeds, fibers, plantation crops etc. Aims and objectives of plant breeding

UNIT 2- Modes of reproduction, sexual, asexual, apomixes and their classification; significance in plant breeding. Modes of pollination, genetic consequences, differences between self and cross pollinated crops. Methods of breeding-introduction and acclimatization selection, mass selection Johannson's pure line theory

UNIT 3- Hybridization, aims and objectives, types of hybridization Methods of handling of segregating generations, pedigree method, bulk method, back cross method and various modified methods Incompatibility and male sterility and their utilization in crop improvement

UNIT 4- Heterosis, inbreeding depression, various theories of heterosis, exploitation of hybrid vigour development of inbred lines, single cross and double cross hybrids

UNIT 5- Population improvement programmes, recurrent selection, synthetics and Composites. Methods of breeding for vegetative propagated crops. Clonal selection. Mutation breeding

Practical

1. Botanical description and floral biology
2. Study of megasporogenesis and microsporogenesis
3. Fertilization and life cycle of an angiospermic plant
4. Plant Breeder's kit
5. Hybridization techniques and precautions to be taken
6. Floral morphology, selfing, emasculation and crossing techniques
7. Study of male sterility and incomparability in field crops : Rice and Sorghum, Maize and Wheat, Bajra and Ragi, Sugarcane and coconut, Groundnut, Castor, Safflower and Sesamum, Redgram, Bengalgram and Green gram, Soybean and Blackgram

References

1. Plant Breeding – B.D. Singh
2. Principles and Practices of Plant Breeding – J.R. Sharma
3. Breeding field crops – J.M. Poehlman and D.A. Sleper
4. Principles of Plant Breeding – R.C. Choudhary