



SCHOOL OF AGRICULTURE

Programme Educational Objectives (PEOs)

Program Outcomes (POs)

Program Specific Outcomes (PEOs)

Course Outcomes (COs)

[Handwritten signatures and initials]

[Signature]

[Signature]

[Signature]

[Signature]

[Signature]

[Signature]

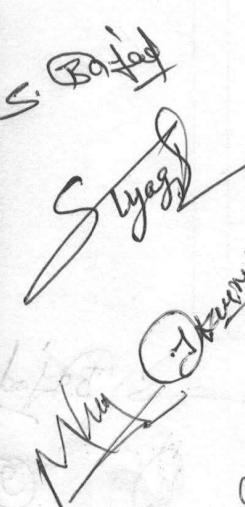
EKALAVYA UNIVERSITY, DAMOH (M.P.)

Scheme of Examination B.Sc. (Hons.) Agriculture I Year

/For batch in Admitted in Academic Session 2023-24/

Semester - II

S. No.	Subject Code	Subject Name	Sessional				Total	Contact Periods Per Week			Credit
			Theory	Mid Sem.	Class Assignment	Practical		L	T	P	
1	BAGRI20S201	Fundamentals of Genetics	50	30	5	15	100	2	0	1	3(2+1)
2	BAGRI20S202	Agricultural Microbiology	50	30	5	15	100	1	0	1	2(1+1)
3	BAGRI20S203	Soil and Water Conservation Engineering	50	30	5	15	100	1	0	1	2(1+1)
4	BAGRI20S204	Fundamentals of Crop Physiology	50	30	5	15	100	1	0	1	2(1+1)
5	BAGRI20S205	Fundamentals of Agricultural Economics	50	40	10	0	100	2	0	0	2(2+0)
6	BAGRI20S206	Fundamentals of Plant Pathology	50	30	5	15	100	3	0	1	4(3+1)
7	BAGRI20S207	Fundamentals of Entomology	50	30	5	15	100	3	0	1	4(3+1)
8	BAGRI20S208	Fundamentals of Agricultural Extension Education	50	30	5	15	100	2	0	1	3(2+1)
9	BAGRI20S209	Communication Skills and Personality Development	50	30	5	15	100	1	0	1	2(1+1)
Total											
			24(16+8)								



 Prof. B. S. Singh

 Prof. S. Singh

 Prof. M. Singh

 Prof. P. Singh

 Prof. R. Singh

 Prof. S. Singh

 Prof. T. Singh

 Prof. U. Singh

 Prof. V. Singh

 Prof. W. Singh

 Prof. X. Singh


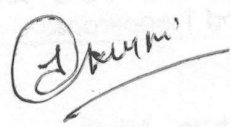

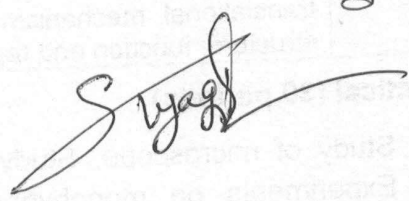


 Prof. Y. Singh

 Prof. Z. Singh

SCHEME

The structure of the course will comprise nine-papers in Semester II.

SEMESTER-II			
S. No.	Subject Title	Subject Code	Credits
1.	Fundamentals of Genetics	BAGRI20S201	3(2+1)
2.	Agricultural Microbiology	BAGRI20S202	2(1+1)
3.	Soil and Water Conservation Engineering	BAGRI20S203	2(1+1)
4.	Fundamentals of Crop Physiology	BAGRI20S204	2(1+1)
5.	Fundamentals of Agricultural Economics	BAGRI20S205	2(2+0)
6.	Fundamentals of Plant Pathology	BAGRI20S206	4(3+1)
7.	Fundamentals of Entomology	BAGRI20S207	4(3+1)
8.	Fundamentals of Agricultural Extension Education	BAGRI20S208	3(2+1)
9.	Communication Skills and Personality Development	BAGRI20S209	2(1+1)
Total			24(16+8)

Class			B.Sc. (Hons.) Agriculture		
Year/Semester			1 st Year, 2 nd Semester		
Branch			Agriculture		
Paper Name			Fundamentals of Genetics		
Subject Code			BAGRI20S201		
L	T	P	Credit Total	3 (2+1)	
2	0	1			
<p>Course Objectives: The course is aimed at</p> <ol style="list-style-type: none"> 1. Imparting knowledge on the fundamental aspects of genetics and its applications. 2. Describing cell division and the functions of the genetic material. 3. Illustrating the molecular mechanisms of inheritance and gene regulation. <p>Expected Course Outcome: At the end of the course the student should be able to</p> <ol style="list-style-type: none"> 1. Apply the knowledge gained on inheritance and variation. 2. Develop problem-solving skills pertaining to inheritance. 3. To relate mutation to evolution and heredity. 4. Interpret the functions of genetic material. 5. Solve and analyze problems in basic genetics. 					
UNIT	SYLLABUS				PERIODS
UNIT 1	Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity.				2
UNIT 2	Architecture of chromosome; chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere; special types of chromosomes. Chromosomal theory of inheritance, cell cycle and cell division- mitosis and meiosis. Probability and Chi-square. Dominance relationships, Epistatic interactions with example.				6
UNIT 3	Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical variations in chromosome and their implications,				7
UNIT 4	Use of haploids, dihaploids and doubled haploids in Genetics, Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation, Qualitative & Quantitative traits,				4
UNIT 5	Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance, Genetic disorders, Nature, structure & replication of genetic material. Protein synthesis, Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation, Lac and Trpoperons.				11

Practical (30 periods)

Study of microscope, Study of cell structure. Mitosis and Meiosis cell division. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross, Experiments on epistatic interactions including test cross and back cross, Practice on mitotic and meiotic cell division, Experiments on probability and Chi-square test.

(Handwritten signatures and initials)

Determination of linkage and cross-over analysis (through two point test cross and three point test cross data). Study on sex linked inheritance in Drosophila. Study of models on DNA and RNA structures.

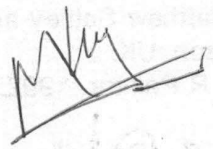


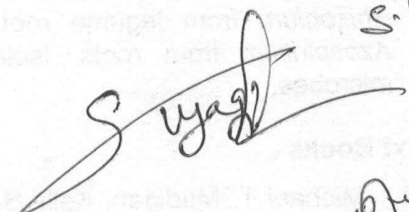
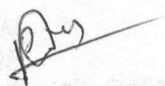
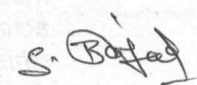
Text Books

1. Singh, B.D. 2013. Genetics. 2nd edition. Kalyani Publishers, India.
2. Arnold Berk , Chris A. Kaiser , Harvey Lodish , Angelika Amon, HiddePloegh, Anthony Bretscher, Monty Krieger, Kelsey C. Martin. 2016. Molecular Cell Biology, 8th edition, W.H. Freeman. USA.

Reference Books

1. Gardner, E.J., Simmons, M.J., and Snustad. D.P. 2006. Principles of genetics. 8th edition. Wiley India, India.
2. Jocelyn E. Krebs, Elliott S. Goldstein, Stephen T. Kilpatrick. 2017. Lewin's GENES XII. 12th revised edition. Jones and Bartlett Publishers Inc., USA.
3. David L. Nelson and Michael M. Cox. 2017. Lehninger Principles of Biochemistry: International Edition. 7th edition, W.H. Freeman. USA.
4. Anthony J.F. Griffiths, Susan R. Wessler, Sean B. Carroll and John Doebley. 2015. Introduction to Genetic Analysis. 11th edition. W.H. Freeman. USA.

(Handwritten signatures and initials)

Class			B.Sc. (Hons.) Agriculture		
Year/Semester			1 st Year, 2 nd Semester		
Branch			Agriculture		
Paper Name			Agricultural Microbiology		
Subject Code			BAGRI20S202		
L	T	P	Credit Total	2(1+1)	
1	0	1			

Course Objectives: The course is aimed at

1. Imparting knowledge on the fundamental aspects of agricultural microbiology and introduce them to its applications.
2. Describing the relationship between microbes and plants.
3. Defining the role of microbes in enhancing the productivity of crops by enriching soil fertility.

Expected Course Outcome: At the end of the course the student should be able to

1. Discriminate prokaryotic and eukaryotic microbes.
2. Delineate the structure and growth of bacteria.
3. Utilize microbes as models to study genetics.
4. Use microbes in enriching specific plant nutrients.
5. Analyze the ubiquitous nature of microbes inhabiting a wide range of ecological habitats.
6. Practice bacterial isolation.

UNIT	SYLLABUS	PERIODS
UNIT 1	Introduction, Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth	4
UNIT 2	Bacterial genetics: Genetic recombination transformation, conjugation and transduction, plasmids, transposon.	4
UNIT 3	Role of microbes in soil fertility and crop production	1
UNIT 4	Carbon, Nitrogen, Phosphorus and Sulphur cycles. Biological nitrogen fixation- symbiotic, associative and a symbiotic.	3
UNIT 5	Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere. Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.	3

Practical (30 periods)

Introduction to microbiology laboratory and its equipments; Microscope- parts, principles of microscopy, resolving power and numerical aperture. Methods of sterilization. Nutritional media and their preparations. Enumeration of microbial population in soil- bacteria, fungi, actinomycetes. Methods of isolation and purification of microbial cultures. Isolation of *Rhizobium* from legume root nodule. Isolation of *Azotobacter* from soil. Isolation of *Azospirillum* from roots. Isolation of BGA. Staining and microscopic examination of microbes.

Text Books

1. Michael T. Madigan, Kelly S. Bender, Daniel H. Buckley, W. Matthew Sattley and David Stahl. 2017. Brock Biology of Microorganisms. 15th Edition. Pearson. UK.
2. Roger Y. Stanier, John L. Ingraham, Mark L Wheelis and Rage R Painter. 1992. General

Microbiology. 5th Edition. Macmillan, Hampshire & London. UK.

Reference Books

1. Bagyaraj D. J. and G.Rangaswami. 2007. Agricultural Microbiology 2nd Edition. PHI Learning Private Limited. India.
2. Aneja K.R. 2017. Fundamental Agricultural Microbiology. New Age International Publishers, India.
3. Subba Rao, N.S. 2017. Soil Microbiology. 5th Edition (PB), Published by Medtec. University Book Store. New Delhi, India.
4. Martin Alexander. 1991. Introduction to Soil Microbiology. 2nd Edition, Krieger pub. Co. USA.

UNIT	TOPICS
UNIT I	Introduction to the soil microbiology, soil as a habitat for microorganisms, and the role of soil microorganisms in soil fertility and plant growth.
UNIT II	Soil microorganisms and their role in soil fertility, soil structure, and soil water relations.
UNIT III	Soil microorganisms and their role in soil fertility, soil structure, and soil water relations.
UNIT IV	Soil microorganisms and their role in soil fertility, soil structure, and soil water relations.
UNIT V	Soil microorganisms and their role in soil fertility, soil structure, and soil water relations.

(Handwritten signatures and marks)

S. Bafad

Syag

39

Class			B.Sc. (Hons.) Agriculture	
Year/Semester			1 st Year, 2 nd Semester	
Branch			Agriculture	
Paper Name			Soil and Water Conservation Engineering	
Subject Code			BAGRI20S203	
L	T	P	Credit Total	2(1+1)
1	0	1		

Course Objectives: The course is aimed at

1. Providing knowledge on different surveying methods used in agricultural field.
2. Imparting knowledge on the loss of soil and techniques to conserve soil.
3. Describing techniques of water harvesting and watershed concepts.

Expected Course Outcome: At the end of the course the student should be able to

1. Apply different surveying methods to measure area in agricultural field.
2. Determine soil loss for a specific area based on erosivity and erodibility factor.
3. Relate different techniques to control wind erosion.
4. Apply rain water harvesting methods to conserve water.
5. Interpret case studies related to soil and water conservation.
6. Design irrigation systems and plan erosion control measures.

UNIT	SYLLABUS	PERIODS
UNIT 1	Introduction to Soil and Water Conservation causes of soil erosion. Definition and agents of soil erosion, water erosion: Forms of water erosion.	2
UNIT 2	Gully classification and control measures. Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques.	3
UNIT 3	Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing.	2
UNIT 4	Grassed water ways and their design. Water harvesting and its techniques.	5
UNIT 5	Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.	3

Practical (30 periods)

General status of soil conservation in India, Calculation of erosion index, Estimation of soil loss, Measurement of soil loss, Preparation of contour maps. Design of grassed water ways, Design of contour bunds, Design of graded bunds, Design of bench terracing system, Problem on wind erosion.

Text Book

1. Huffman, Rodney L., Delmar D. Fangmeier, William J. Elliot, and Stephen R. Workman. 2013. Soil and Water Conservation Engineering, 7th edition. American Society of Agricultural Engineers. Michigan, USA.
2. Khan Towhid Osman. 2013. Soil Degradation, Conservation and Remediation. Springer, Germany.

[Handwritten signature]

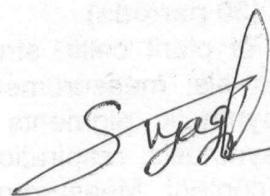
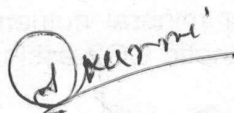

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

Reference Books

1. Ghanashyam Das. 2009. Hydrology and Soil Conservation engineering: Including Watershed Management. Prentice Hall India Learning Private Limited, India.
2. Gurmail Singh et al., 1990. Manual of soil and water Conservation practices in India. Oxford & IBH Publishing Co., New Delhi, India.

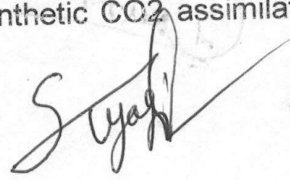
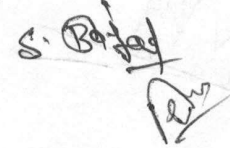


Class			B.Sc. (Hons.) Agriculture	
Year/Semester			1 st Year, 2 nd Semester	
Branch			Agriculture	
Paper Name			Fundamentals of Crop Physiology	
Subject Code			BAGRI20S204	
L	T	P	Credit Total	2(1+1)
1	0	1		
<p>Course Objectives: The course is aimed at</p> <ol style="list-style-type: none"> 1. Instilling information on basic plant physiological functions, processes and its importance crop production. 2. Infusing knowledge on growth and development, and to make the students understand how knowledge about these concepts has led to improved productivity in modern agriculture. 3. Imparting knowledge on remedy measures involved in solving plant physiological problems. <p>Expected Course Outcome: At the end of the course the student should be able to</p> <ol style="list-style-type: none"> 1. Define different physiological process at plant and cellular level 2. Summarize mechanisms of uptake, transport and translocation of water and nutrients 3. Distinguish carbon cycles in plants and define lipid metabolism 4. Relate the importance of growth regulators in plant growth 5. Explain nutrient deficiencies and physiological requirements of plants 6. Interpret and measure plant physiological data 				
UNIT		SYLLABUS		PERIODS
UNIT 1	Introduction to crop physiology and its importance in Agriculture.			1
UNIT 2	Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology; Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms.			8
UNIT 3	Photosynthesis: Light and Dark reactions, C ₃ , C ₄ and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain.			2
UNIT 4	Fat Metabolism: Fatty acid synthesis and Breakdown.			1
UNIT 5	Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.			3

Practical (30 periods)

Study of plant cells, structure and distribution of stomata, imbibitions, osmosis, plasmolysis, measurement of root pressure, rate of transpiration, Separation of photosynthetic pigments through paper chromatography, Rate of transpiration, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content, Measurement of photosynthetic CO₂ assimilation by Infra Red Gas



Analysar (IRGA).

Text Books

1. Lincoln Taiz, Eduardo Zeiger, Ian M. Moller, and Angus Murphy. 2018. Plant Physiology and Development, International Sixth Edition. Sinauer; Oxford University Press; USA.
2. Frank B. Salisbury. 2006. Plant physiology. 4th edition. Sinauer Associates, Inc., USA.

Reference Books

1. Mohr, H and P. Schopfer. 1995. Plant physiology, Springer-Verlag, Germany.
2. Buchanan. B. B. 2015. Biochemistry and Molecular Biology of Plants. 2nd Edition. Wiley Blackwell, USA.
3. Willey, N. 2016. Environmental Plant Physiology, 1st Edition, Garland Science, Taylor and Francis Group, LLC, UK.

[Handwritten signatures and initials at the bottom of the page]

Class			B.Sc. (Hons.) Agriculture	
Year/Semester			1 st Year, 2 nd Semester	
Branch			Agriculture	
Paper Name			Fundamentals of Agricultural Economics	
Subject Code			BAGRI20S205	
L	T	P	Credit Total	2(2+0)
2	0	0		
<p>Course Objectives: The course is aimed at</p> <ol style="list-style-type: none"> 1. Imparting knowledge on the basics of economics. 2. Explaining on the factors of production and economy. 3. Enhancing the ability of analyzing economic models to facilitate creation of innovative ideas. <p>Expected Course Outcome: At the end of the course the student should be able to</p> <ol style="list-style-type: none"> 1. Apply the knowledge gained on the fundamentals of economics. 2. Employ agricultural economic applications. 3. Practice applying mathematical models to agro-economics. 4. Interpret market structures responsible for creating national income. 5. Analyze agro economic growth and develop policies. 6. Integrate agro-economic knowledge with real time application. 				
UNIT	SYLLABUS			PERIODS
UNIT 1	Economics: Meaning, scope and subject matter, definitions, activities, approaches to economic analysis; micro and macro economics, positive and normative analysis. Nature of economic theory; rationality assumption, concept of equilibrium, economic laws as generalization of human behavior. Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare.			7
UNIT 2	Agricultural economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. Agricultural planning and development in the country. Demand: meaning, law of demand, schedule and demand curve, determinants, utility theory; law of diminishing marginal utility, equi-marginal utility principle. Consumer's equilibrium and derivation of demand curve, concept of consumer surplus. Elasticity of demand: concept and measurement of price elasticity, income elasticity and cross elasticity.			8
UNIT 3	Production: process, creation of utility, factors of production, input output relationship. Laws of returns: Law of variable proportions and law of returns to scale. Cost: concepts, short run and long run cost curves. Supply: Stock v/s supply, law of supply, schedule, supply curve, determinants of supply, elasticity of supply.			5
UNIT 4	Market structure: meaning and types of market, basic features of perfectly competitive and imperfect markets. Price determination under perfect competition; short run and long run			5

M. K.

J. K.

P. S.

S. Y.

S. P.

	equilibrium of firm and industry, shut down and break even points. Distribution theory: meaning, factor market and pricing of factors of production. Concepts of rent, wage, interest and profit.	
UNIT 5	National income: Meaning and importance, circular flow, concepts of national income accounting and approaches to measurement, difficulties in measurement. Population: Importance, Malthusian and Optimum population theories, natural and socio economic determinants, current policies and programmes on population control. Money: Barter system of exchange and its problems, evolution, meaning and functions of money, classification of money, supply, general price index, inflation and deflation. Banking: Role in modern economy, types of banks, functions of commercial and central bank, credit creation policy. Agricultural and public finance: meaning, micro v/s macro finance, need for agricultural finance, public revenue and public expenditure. Tax: meaning, direct and indirect taxes, agricultural taxation, VAT. Economic systems: Concepts of economy and its functions, important features of capitalistic, socialistic and mixed economies, elements of economic planning.	5

Text Book

1. Andrew Barkley and Paul W. Barkley. 2013. Principles of Agricultural Economics. Routledge, Taylor and Francis Group, New York, USA.
2. Amarjit Singh, A.N. Sadhu and Jasbir Singh. 2016. Fundamentals of Agricultural Economics. Himalaya Publishing House, India.

Reference Books

1. Edwin Griswold Nourse. 2017. Agricultural Economics: A Selection of Materials in Which Economic Principles Are Applied to the Practice of Agriculture. CHIZINE PUBN. Canada.
2. Thomas Sowell. 2010. Basic Economics 4th Edition: A Common Sense Guide to the Economy. Blackstone Audio, Inc., Unabridged edition. USA.

Handwritten signatures and initials at the bottom of the page, including a large signature that appears to be "S. Singh" and another that appears to be "S. Bafal".

Class			B.Sc. (Hons.) Agriculture		
Year/Semester			1 st Year, 2 nd Semester		
Branch			Agriculture		
Paper Name			Fundamentals of Plant Pathology		
Subject Code			BAGRI20S206		
L	T	P	Credit Total	4(3+1)	
3	0	1			

Course Objectives: The course is aimed at

1. Imparting knowledge on importance of plant diseases, pathogens and development of plant diseases, disease cycle, physiology of pathogens and plant defense
2. Describing epidemiology of plant diseases and strategies for management
3. Explaining morphology, vegetative, reproductive structures and resting structures of fungi, bacteria, nematodes and other plant pathogens.

Expected Course Outcome: At the end of the course the student should be able to

1. Recognize the importance and scope of plant pathology and analyze the causes and factors leading to pathogenesis
2. Classify pathogens taxonomically for designing effective disease management strategies
3. Differentiate plant pathogens based on morphology, vegetative, reproductive and resting structures.
4. Relate disease cycles, physiology of pathogens and plant defense
5. Describe epidemiology of plant diseases and strategies for disease management
6. Practice identifying and controlling pathogens

UNIT	SYLLABUS	PERIODS
UNIT 1	Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology. Pathogenesis. Causes / factors affecting disease development: disease triangle and tetrahedron and classification of plant diseases. Important plant pathogenic organisms, different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to abiotic causes.	15
UNIT 2	Fungi: general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, sub-divisions, orders and classes.	8
UNIT 3	Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction. Viruses: nature, structure, replication and transmission. Study of	8

(Handwritten signatures and initials)

	phanerogamic plant parasites.	
UNIT 4	Nematodes: General morphology and reproduction, classification, symptoms and nature of damage caused by plant nematodes (Heterodera, Meloidogyne, Anguina, Radopholusetc.)	5
UNIT 5	Growth and reproduction of plant pathogens. Liberation / dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens. Pathogenesis. Role of enzymes, toxins and growth regulators in disease development. Defense mechanism in plants. Epidemiology: Factors affecting disease development. Principles and methods of plant disease management. Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.	9

Practical (30 periods)

Acquaintance with various laboratory equipments and microscopy. Collection and preservation of disease specimen. Preparation of media, isolation and Koch's postulates. General study of different structures of fungi. Study of symptoms of various plant diseases. Study of representative fungal genera. Staining and identification of plant pathogenic bacteria. Transmission of plant viruses. Study of phanerogamic plant parasites. Study of morphological features and identification of plant parasitic nematodes. Sampling and extraction of nematodes from soil and plant material, preparation of nematode mounting. Study of fungicides and their formulations. Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations.

Text Books

1. Singh, R.S. 2017. Introduction to Principles of Plant Pathology. 5th Edition, MedTech Publishers, India.
2. Mehrotra, R.S. and A. Aggarwal. 2017. Plant Pathology. 3rd Edition, Tata McGraw Hill Publishing Co Ltd., India.

Reference Books

1. Bhattacharya, U.K. 2017. Plant Pathology at a Glance. 1st Edition, Kalyani Publishers, India.
2. Aneja, K.R. 2015. An Introduction to Mycology. 2nd Edition, New Age International Pvt. Ltd., Chennai, India.

Handwritten signatures and initials at the bottom of the page, including a large signature on the right and several smaller ones below it.

Class			B.Sc. (Hons.) Agriculture		
Year/Semester			1 st Year, 2 nd Semester		
Branch			Agriculture		
Paper Name			Fundamentals of Entomology		
Subject Code			BAGRI20S207		
L	T	P	Credit Total	4(3+1)	
3	0	1			

Course Objectives: The course is aimed at

1. Providing deeper understanding on the biology of insects.
2. Imparting knowledge on historical evolutionary relationships of insect orders and families.
3. Describing insect life cycle, morphology and adaptation to a wide variety of natural environments by taking students on field trips and collecting insects.

Expected Course Outcome: At the end of the course the student should be able to

1. Express knowledge gained on the historic contributions of eminent scientists in the field of entomology and fascinating facts about insects.
2. Describe insect's anatomy and morphology.
3. Infer biochemical and physiological processes governing insect metabolism, growth, and form.
4. Relate ecological relationships of insects with other life forms.
5. Devise pest control measures.
6. Identify insects based on their key taxonomic characters.

UNIT	SYLLABUS	PERIODS
UNIT 1	History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting.	6
UNIT 2	Body segmentation, Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ.	10
UNIT 3	Metamorphosis and diapauses in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system, in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor. Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors– temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors – food competition, natural and environmental resistance.	10
UNIT 4	Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical control,	9

(Handwritten signatures and marks)

	importance, hazards and limitations. Recent methods of pest control, repellents, anti feed ants, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes.	
UNIT 5	Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata: Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthredinidae, Apidae. Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.	10

Practical (30 periods)

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper); Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. Insecticides and their formulations. Pesticide appliances and their maintenance. Sampling techniques for estimation of insect population and damage.

Text Books

1. Chapman, R. F. 2012. Insects: Structure and Function. Ed by Simpson, S. J. and Douglas, A. C. Cambridge Univ. Press, UK.
2. Wigglesworth, V.B. 2013. Insect Physiology. Springer, Netherlands (Originally published by Chapman and Hall, London, 1974).

Reference Books

1. Timbhare, D.B. 2015. Modern Entomology, Himalaya Publishing House. India.
2. Vasantharaj David, B. and Rama Murthy V.V. 2016. Elements of Economic Entomology, Popular Book Depot, Coimbatore, India.

(Handwritten signatures and marks)

62

49

	principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel; extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies;	
UNIT 5	Communication: meaning and definition; Principles and Functions of Communication, models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.	7

Practical (30 periods)

To get acquainted with university extension system. Group discussion- exercise; handling and use of audio visual equipments and digital camera and LCD projector; preparation and use of AV aids, preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories; Presentation skills exercise; micro teaching exercise; A visit to village to understand the problems being encountered by the villagers/ farmers; to study organization and functioning of DRDA and other development departments at district level; visit to NGO and learning from their experience in rural development; understanding PRA techniques and their application in village development planning; exposure to mass media: visit to community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

Text Books

1. Satyanarayana, G. and S, M.H. 2012. Rural Development and Poverty Alleviation in India: Policies and Programmes. New Century Publications. India.
2. Gupta, K.R. 2010. Rural Development in India. Atlantic. India.

Reference Books

1. Rao, N.G.P. and Perumal, N. and Ghosal, S.L. and Arora, S.K. 1997. Training for Agricultural Development: (study Commissioned by the Government of India). Allied Publishers and Manage. India.
2. Jana, B.L. 2014. Agricultural Journalism. AgroTech Publishing Academy. India.

Handwritten signatures and initials at the bottom of the page, including a large signature on the right and several smaller ones on the left and bottom right.

Class			B.Sc. (Hons.) Agriculture		
Year/Semester			1 st Year, 2 nd Semester		
Branch			Agriculture		
Paper Name			Communication Skills and Personality Development		
Subject Code			BAGRI20S209		
L	T	P	Credit Total	2(1+1)	
1	0	1			
<p>Course Objectives: The course is aimed at</p> <ol style="list-style-type: none"> 1. To develop ability for listening and note taking, writing skills, oral presentation skills field diary and lab record. 2. To create expert for handling and use of audio visual equipments such as digital camera and LCD projector. 3. To develop leadership <i>via</i> group discussion, presentations, lecture delivery and communication to radio/radio station/newspaper office with expositing to mass media. <p>Expected Course Outcome: At the end of the course the student should be able to</p> <ol style="list-style-type: none"> 1. To create good leaders for society and media. 2. Provides good skills for taking, writing, presentation skills face to society for human welfare. 					
UNIT	SYLLABUS				PERIODS
UNIT 1	Communication Skills: Structural and functional grammar. *				2
UNIT 2	Meaning and process of communication, verbal and nonverbal communication.				3
UNIT 3	Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures.				3
UNIT 4	Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting.				2
UNIT 5	Individual and group presentations, impromptu presentation, public speaking; Group discussion, Organizing seminars and conferences.				5

Practical (30 periods)

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations.

Text books

1. Sandhu, A. S. (1999). Textbook on Agricultural Communication; process and methods oxford RIBH Publishing co. Pvt. Ltd. New Delhi.
2. Oxford and IBH publishing Co. Pvt. Ltd., New Delhi. 4. Jalihal, K. A. and Veerabhadraiah, V., 2007, Fundamentals of Extension Education and Management in Extension, Concept publishing company, New Delhi.
3. Supe, S. V., 2013 (2nd Edition), A Text Book of Extension Education, Agrotech Publishing Academy, Udaipur.

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

