

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Fundamentals of Genetics
Paper Code: AG131
w.e.f. Session 2018-19

3(2+1)

Theory

Unit 1.

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. 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,

Unit 2.

Epistatic interactions with example. 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,

Unit 3.

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, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance. Genetic disorders.

Unit 4.

Nature, structure & replication of genetic material. Protein synthesis, Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation, Lac and Trp operons.

Practical

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. 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.

Suggested Readings:

- *Fundamentals of Genetics* Singh B D. Kalyani Publishers, New Delhi
- *Understanding Genetics* (I Ed.) Norman, V. Rothwell. Oxford University Press, Oxford
- *Principles of Genetics* (II Ed). Gardner E J, Simmons M J & Snustard D P. John Wiley & Sons, New York.
- *Selected Problems in Genetics* (Vol.1-3). Srivastava & Tyagi. Anmol Publications Pvt. Ltd., New Delhi.
- Latest Genetics Books and Update :
<https://www.intechopen.com/books/subject/agricultural-and-biological-sciences>

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Agricultural Microbiology
Paper Code: AG132
w.e.f. Session 2018-19

2(1+1)

Theory

Unit 1.

Introduction. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth.

Unit 2.

Bacterial genetics: Genetic recombination transformation, conjugation and transduction, plasmids, transposon.

Unit 3.

Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and Sulphur cycles. Biological nitrogen fixation- symbiotic, associative and asymbiotic. Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere.

Unit 4.

Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.

Practical

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.

Suggested Readings:

- Soil Microbiology - R.M. Aggarwal, 2013. Wisdom Press/Dominant Publishers and Distributers
- Fundamental Agricultural Microbiology K R Aneja, New Age International Publishers
- Biofertilizer Technology, Singh and Purohit, 2008. Agrobios
- Agricultural Microbiology, Rangaswamy, G, PHI Publication
- Agricultural Microbiology Question Bank download from:
<http://www.agrimoon.com/wp-content/uploads/Agriculture-Microbiology-Question-Bank.pdf>
- Agricultural Microbiology- ICAR ECourse PDF Book download from:
<http://www.agrimoon.com/agricultural-microbiology-icar-ecourse-pdf-book/>

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Soil and Water Conservation Engineering
Paper Code: AE141
w.e.f. Session 2018-19

2(1+1)

Theory

Unit 1.

Introduction to Soil and Water Conservation, causes of soil erosion. Definition and agents of soil erosion, water erosion: Forms of water erosion. Gully classification and control measures.

Unit 2.

Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques. Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing.

Unit 3.

Grassed water ways and their design. Water harvesting and its techniques. Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

Practical

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.

Suggested Readings:

- *Land and Water Management Engineering. 4th Edition*, Murthy, V.V.N. 2002. Kalyani Publishers, New Delhi.
- *Manual of Soil and Water Conservation Practices*. Singh Gurmel, C. Venkataraman, G. Sastry and B.P. Joshi. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- *Soil and Water Conservation Engineering*. Suresh, R. 2014. Standard Publisher Distributors, New Delhi.
- *Soil and Water Conservation Engineering.4th Edition*, Schwab, G.O., D.D. Fangmeier, W.J. Elliot, R.K. Frevert John Wiley and Sons Inc. New York.
- *Water Harvesting and Recycling: Indian Experiences*. Samra, J.S., V.N. Sharda and A.K. Sikka. 2002. CSWCR&TI, Dehradun, Allied Printers, Dehradun.

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Fundamentals of Crop Physiology
Paper Code: AG133
w.e.f. Session 2018-19

2(1+1)

Theory

Unit 1.

Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology

Unit 2.

Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; Photosynthesis: Light and Dark reactions, C₃, C₄ and CAM plants

Unit 3.

Respiration: Glycolysis, TCA cycle and electron transport chain; Fat Metabolism: Fatty acid synthesis and Breakdown

Unit 4.

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

Practical

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 Analyser (IRGA).

Suggested Readings:

- *Plant Physiology*. Salisbulry. 2007. CBS. New Delhi
- *Plant Growth Substances*. CBS. Richard, N. Arteca. 2004. New Delhi.
- *Abiotic stress adaptation in plants: Physiological, Molecular and Genomic foundation* Aswani pareek, S.K. Sopory, Hans Bohnert Govindjee.
- *Plant Physiology* S N Pandey and B K Sinha, Vikas Publishers
- *Plant Physiology*. Zeiger. 2003. PANIMA. New Delhi
- *Crop Physiology I and II Edition, 2014* Download from: <https://www.elsevier.com/books/crop-physiology/sadras/978-0-12-417104-6>
- *Handbook of Crop Physiology, 2014* CRC Press by Mohammad Pessarakli

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Fundamentals of Agricultural Economics
Paper Code: BM161
w.e.f. Session 2018-19

2(2+0)

Theory

Unit1.

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.

Unit 2.

Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. 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.

Unit 3.

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. 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. 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 equilibrium of firm and industry, shut down and break even points.

Unit 4.

Distribution theory: meaning, factor market and pricing of factors of production. Concepts of rent, wage, interest and profit. 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 socioeconomic 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.

Unit 5.

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.

Suggested Readings:

- Fundamentals of Agricultural Economics 2016. A Marjeet Singh, A N Sadhu and J Singh, Himalya Publishing House *Fundamentals of Entrepreneurship*. Nandan H. 2011. PHI Learning Pvt Ltd India.
- *Essentials of Management: An International Perspective*, 2nd Ed. Harold Koontz & Heinz Weihrich. Tata Mc-Graw Hill Publishing Pvt Ltd.
- *The Agribusiness Book*. Mukesh Pandey & Deepali Tewari. 2010. IBDC Publishers.
- Get Latest PDF books from: <http://www.agrimoon.com/principles-of-agricultural-economics-pdf-book/>

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Agri-Informatics
Paper Code: AG134
w.e.f. Session 2018-19

2(1+1)

Unit-1

Introduction to Computers, Operating Systems, definition and types, Applications of MSOffice for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (www): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations.

Unit-2

e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management.

Unit-3

Smartphone Apps in Agriculture for farm advisory, e-banking markets market price, postharvest management etc; Geospatial technology for generating valuable agri-information. Decision support systems, concepts, components and applications in Agriculture.

Unit-4

Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning using IT tools.

Practical

Study of Computer Components, accessories, practice of important DOS Commands. Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW). Introduction of programming languages. Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools. Introduction of Geospatial Technology for generating valuable information for Agriculture. Hands on Decision Support System. Preparation of contingent crop planning. Forecasting and early warning

Suggested Readings:

- Agri Informatics: An Introduction (Industry Series), by R Chakravarthy, ICFAI UNIVERSITY PRESS
- E-Agriculture: Concepts and Applications (Agriculture Series), Rahul Gupta (Author), ICFA UNIVERSITY PRESS
- Sinha P.K. Computer Fundamentals, BPB Publishing.
- Computer Fundamental and programming, Pradip Dey and Manas Ghosh.
- Expert System for Decision Support in Agriculture N. Sriram and H. Philip.
- Agro-Informatics, G. Vanitha, New Delhi Publishing Agency.
- Peter Nortons, Introductions to Computers, Tata McGraw Hill.
- Price Michael, Office in Easy Steps, TMH Publication.
- MS-Office 2013 with Practical Assignments.

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Fundamentals of Entomology
Paper Code: AG135
w.e.f. Session 2018-19

4(3+1)

Theory

Unit 1.

Introduction to phylum arthropoda. Importance of class Insecta. Insect dominance. History of entomology in India, Importance of entomology in different fields. Definition, division and scope of entomology.

Unit 2.

Comparative account of external morphology-types of mouth parts, antennae, legs, wings and genitalia. Structure, function of cuticle & moulting and body segmentation,

Unit 3.

Anatomy of digestive, Circulatory, Sensory, respiratory, glandular, excretory, nervous and reproductive systems. Types of reproduction. Postembryonic development-eclosion.

Unit 4.

Matamorphosis. Types of egg larvae and pupa. Classification of insects upto orders, sub-order and families of economic importance and their distinguished characters. Plant mites – morphological features, important families with examples.

Practical

Insect collection and preservation. Identification of important insects. General body organization of insects. Study on morphology of grasshopper or cockroach. Preparation of permanent mounts of mouth parts, antennae, legs and wings. Dissection of grasshopper and caterpillar for study of internal morphology. Observations on metamorphosis of larvae and pupae. Dissection of cockroaches.

Suggested Readings:

Handbook of Entomology by T V Prasad 2016. Kindle Edition.

Introduction to General and Applied Entomology. Awasthi, V.B. Scientific Publishers, Jodhpur, 379 p.

The Insects: Structure and Function. Chapman, R.F. 1981. Edward Arnold (Publishers) Ltd, London

General Entomology. Mani, M.S. Oxford and IBH Publishing Co. Pvt Ltd., New Delhi

Biology of Insects. Saxena, S.C. 1992. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi

An introduction to Entomology, Srivastava, P.D. and R.P.Singh. 1997. Concept Publishing Company, New Delhi, 269p

The Science of Entomology, Romoser, W.S. McMillan, New York, 449p.

Entomology and pest management. III Edition. Pedigo, L.P. 1999. Prentice Hall, New Jersey, USA.

Get latest entomology books online through : <https://www.questia.com/library/science-and-technology/life-sciences-and-agriculture/entomology>

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Fundamentals of Agricultural Extension Education
Paper Code: AG136
w.e.f. Session 2018-19

3(2+1)

Theory

Unit 1.

Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.); various extension/ agriculture development programmes launched by ICAR/Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP, etc.).

Unit 2.

New trends in agriculture extension: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems, etc. Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India.

Unit 3.

Community Development.-meaning, definition, concept & principles, Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions.

Unit 4.

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; 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.

Practical

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.

Suggested Readings:

- Agricultural Extension 2015. Sagar Mondal, Kalyani Publishers
- *Extension Education*, Adivi Reddy, A., 2001, Sree Lakshmi press, Bapatla.
- *Fundamentals of Extension Education and Management in Extension*, Concept Jalihal, K. A. and Veerabhadraiah, V., 2016, publishing company, New Delhi.
- Ray, G. L., 1991 (1st Edition), *Extension Communication and Management*, Kalyani Publishers, Ludhiana {7th revised edition, 2016}.
- Get Guide to Agricultural Extension from: <https://guides.lib.lsu.edu/AEEE>

B. Sc. (Hons.) Agriculture
SEMESTER-II
Syllabus: Communication Skills and Personality Development
Paper Code: LN111
w.e.f. Session 2018-19

2(1+1)

Theory

Unit 1.

Communication Skills: Structural and functional grammar; meaning and process of communication, verbal and nonverbal communication

Unit 2.

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures

Unit 3.

Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations, impromptu presentation, public speaking

Unit 4.

Group discussion. Organizing seminars and conferences. Voice modulation basics and their usage for meaningful impact on people; Attributes of an effective leader; Stress and conflict management; Time management: Personal organization, prioritizing and balancing; Cosmopolitan culture; Impact of non verbal communication; Science of body language; Role of team work.

Practical

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.

Suggested Readings:

- How to Win Friends and Influence People in the Digital Age. Carnegie, Dale. 2012. Simon & Schuster.
- The Seven Habits of Highly Successful People. Covey Stephen R. 1989. Free Press.
- Human Communication: Motivation, Knowledge & Skills. Spitzberg B, Barge K & Morreale, Sherwyn P. 2006. Wadsworth.
- The Art of Communication. Verma, KC. 2013. Kalpaz.