

COURSE CURRICULUM
For
BACHELOR OF SCIENCE (HONS.) DEGREE
IN
AGRICULTURE
[B.Sc. (Hons.) Ag.]

[Proposed from 2018-19]



IIMT UNIVERSITY
MEERUT

COLLEGE OF AGRICULTURE
IIMT UNIVERSITY, MEERUT

(Er. Amit Singh)
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Dean/AAA

B.Sc. (Hons.) Ag. Sem -II
STUDY & EVALUATION SCHEME

S. No.	Course Code	Course Short Name	Course Name	Periods			Credit	Evaluation Scheme		
				L	T	P		External	Internal	Total
1	AG-201	IE	Introductory Entomology	2	1	-	2	35	15	50
2	AG-202	WMIMI	Water Management Including Micro Irrigation	2	1	-	2	35	15	50
3	AG-203	FPP	Fundamentals of Plant Physiology	2	1	-	2	35	15	50
4	AG-204	FAE	Fundamentals of Agricultural Economics	2	1	-	2	35	15	50
5	AG-205	DAEE	Dimensions of Agricultural Extension Education	2	1	-	2	35	15	50
6	AG-206	FPP	Fundamentals of Plant Pathology	2	1		2	35	15	50
7	AG-207	FPB	Fundamentals of Plant Biochemistry and Biotechnology	2	1		2	35	15	50
8	AG-208	ICA	Introduction to Computer Application	2	0		1	35	15	50
9	AG-209	ES	Environmental Science	2	1		1	35	15	50
10	AG-201(P)	IE LAB	Introductory Entomology Lab			2	1	20	5	25
11	AG-202(P)	WMIMI LAB	Water Management Including Micro Irrigation Lab			2	1	20	5	25
12	AG-203(P)	FPP LAB	Fundamentals of Plant Physiology Lab			2	1	20	5	25
13	AG-204(P)	FAE LAB	Fundamentals of Agricultural Economics Lab			2	1	20	5	25
14	AG-205(P)	DAEE LAB	Dimensions of Agricultural Extension Education Lab			2	1	20	5	25
15	AG-206(P)	FPP LAB	Fundamentals of Plant Pathology Lab	-	-	2	1	20	5	25
16	AG-207(P)	FPB LAB	Fundamentals of Plant Biochemistry and Biotechnology Lab	-	-	2	1	20	5	25
17	AG-208(P)	ICA LAB	Introduction to Computer Application Lab	-	-	2	1	20	5	25
				18	9	16	24	475	175	650

Dr. N L Sharma
Dean/AAA

SEMESTER-II

[L= Lecture, T = Tutorials, P = Practicals & C = Credits]

AG 201	INTRODUCTORY ENTOMOLOGY (IE)	2L:1T:0P	2 credits
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UNIT I: (L-6)

History of Entomology in India. Classification of Phylum Arthropoda upto classes and order level.

UNIT II: (L-10)

Morphology of insect (Structure of head, thorax and abdomen) and function of insect, cuticle and moulting. Modifications of insect antennae, mouth parts and legs. Wing venation, modifications and wing coupling apparatus. Metamorphosis and diapause in insects. Types of larvae and pupae.

UNIT III: (L-10)

Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretory (Endocrine) and reproductive systems.

UNIT IV: (L-10)

Study of **Orthoptera**- Acrididae. Dictyoptera; **Isoptera**-Termitidae; **Hemiptera**-Pentatomidae, Aphididae, **Neruoptera**- Chrysopidae; **Lepidoptera**-Noctuidae; **Coleoptera**-Coccinellidae; **Hymenoptera**- Apidae; **Diptera**-Cecidomyiidae.

UNIT V: (L-4)

Significance of insects in Agriculture, beneficial insects.

Recommended Books

1. A Text Book of Entomology Dr. Mathur & Dr. Upadhyay
2. General Entomology Dr. Mathur & Dr. Upadhyay

AG 202	WATER MANAGEMENT INCLUDING MICRO IRRIGATION (WMIMI)	2L:1T:0P	2 credits
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UNIT I: (L-8)

Irrigation: definition and objectives, water resources and irrigation development in India and Uttar Pradesh; Soil plant water relationships

UNIT II: (L-8)

Methods of soil moisture estimation, evapotranspiration and crop water requirement; effective rainfall, scheduling of irrigation.

UNIT III: (L-8)

Methods of irrigation: surface, sprinkler and drip irrigation.

UNIT IV: (L-8)

Irrigation efficiency and water use efficiency, conjunctive use of water ,irrigation water quality and its management.

UNIT V: (L-8)

Water management of different crops (rice, wheat, maize, groundnut, sugarcane, mango, banana, and tomato); Agricultural drainage.

Recommended Books

Irrigation & Water Management Dr. P.K. Singh

AG 203	FUNDAMENTALS OF PLANT PHYSIOLOGY (FPP)	2L:1T:0P	2 credits
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UNIT I: (L-8)

Introduction to crop physiology and its importance in agriculture; Plant cell: an Overview; Diffusion and Osmosis; absorption of water, transpiration and stomatal physiology.

UNIT II: (L-8)

Mineral nutrition of Plants: function and deficiency symptoms of nutrients, nutrient uptake mechanisms.

UNIT III: (L-6)

Photosynthesis: light and dark reaction, C₃, C₄, and CAM plants.

UNIT IV: (L-10)

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

UNIT V: (L-8)

Plant growth regulators: Physiological aspects of growth and development of major crops: Role of Physiological growth in crop productivity.

Recommended Books

Biotechnology, Systematics & Plant Physiology Dr. Onkar Singh

AG 204	FUNDAMENTALS OF AGRICULTURAL ECONOMICS (FAE)	2L:1T:0P	2 credits
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UNIT I**(L-8)**

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.

UNIT II:**(L-8)**

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, demand schedule and demand curve, determinants, utility theory: law of diminishing marginal utility, equi-marginal utility principle. Elasticity of demand; concept and measurement of price elasticity, income elasticity and cross elasticity.

UNIT III:**(L-8)**

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: Cost concepts, short run and long run cost curves Supply: Stock vs supply, law of supply, Market structure: meaning and types of market, Price determination under perfect competition.

UNIT IV:**(L-8)**

Distribution theory: meaning, factor market and pricing of factors of production. Concepts of rent, wage, interest and profit. National income: Meaning and importance. Money: Barter system of exchange and its problems, evolution, meaning and functions of money, classification of money, money supply, general price index, inflation and deflation.

UNIT V:**(L-8)**

Banking: Role in modern economy, types of banks functions of commercial and central bank, credit creation policy. Agricultural and public finance: meaning, micro vs macro finance, need for agricultural finance, public revenue and public expenditure. Tax: meaning, direct and indirect taxes, agricultural taxation Vat. elements of economic planning.

Recommended Books

Agricultural Economics Dr. Markande & Kulshrestha

AG 205	DIMENSIONS OF AGRICULTURAL EXTENSION EDUCATION (DAEE)	2L:1T:0P	2 credits
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UNIT I: (L-4)

Meaning, definition & Types; Education –meaning, definition, scope process; objectives and principles of Extension Education; Extension Programme planning and Programmed Development

UNIT II: (L-8)

Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era. (Etawan 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 III: (L-4)

New trends in agriculture extension: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems, etc.

UNIT IV: (L-8)

Rural Development: Concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Development meaning, definition, concept & principles, philosophy of CE. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions

UNIT V: (L-8)

UNIT V: 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.

UNIT VI: (L-8)

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.

Recommended Books

Training Management in Agricultural Extension Dr. Surendra Kumar

AG 206	FUNDAMENTALS OF PLANT PATHOLOGY (FPP)	2L:1T:0P	2 credits
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UNIT I: (L-8)

Introduction: Importance of plant diseases, scope and objectives of plant pathology , History of Plant Pathology with special reference to Indian work. Pathogenesis and establishment of pathogenesis of Koch's postulates, Causes/ factors affecting disease development: disease triangle and tetrahedron and classification of plant diseases.

UNIT II: (L-8)

Important plant pathogens like fungi, bacteria, phytoplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to abiotic causes.

UNIT III: (L-8)

Definition and general character of Fungi, structure of thallus organisation. Reproduction in fungi.

UNIT IV: (L-8)

Bacteria and mollicutes (PPLO): General morphological characters. Basic methods of classification and reproduction. Viruses: nature , structure, replication and transmission. Nematodes: General morphology and reproduction, symptoms and nature of damage caused by plant nematodes.

UNIT V: (L-8)

Growth and reproduction of plant pathogens. Liberation/ dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens. 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.

Recommended Books

A Text Book of Plant Pathology Dr. Tripathi & Dr. Shukla

AG 207	FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY (FPB)	2L:1T:0P	2 credits
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UNIT I: (L-8)

Importance of Plant Biochemistry: Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotaion; Structure of Disaccharides and Ploysaccharides.

UNIT II: (L-4)

Lipid: importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids.

UNIT III: (L-8)

Proteins: Importance of proteins and classification ; Structures, titration and zwitter ions nature of amino acids; Structural organization of protins. Enzymes: General properties; Classification; Mechanism of action; Michaelis & Menten and Line Weaver Burk equation & plots l Introduction to allosteric enzymes.

UNIT IV: (L-4)

Nucleic acids: Importance and classification: Structure of Nucleotides, A, B & Z DNA; RNA.

UNIT V: (L-8)

Concepts and application of plant biotechnology and Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture , pollen culture and ovule culture and their applications; Micro-propagation methods; organogenesis and embryo genesis, Synthetic seeds and their significance; Embryo rescue and its significance; somatic hybridization and hybrids; Soma clonal variation and its use in crop improvement, Crayo-preservation.

UNIT VI: (L-8)

Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG medicated) and Agrobacterium mediated gene transfer methods; Transgenics and its importance in crop improvement; PCR techniques and its applications and Biotechnology regulations.

Recommended Books

A Text Book of Biochemistry Dr. J.P. Chaudhary

AG 208	INTRODUCTION OF COMPUTER APPLICATIONS (ICA)	2L:1T:0P	2 credits
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UNIT I:**(L-8)**

Introduction to Computers, Anatomy of Computers, Input and Output Devices. Units of Memory, Hardware, Software and Classification of Computers. Personal Computers, Types of Processors, booting of computer, warm and cold booting. Computer Viruses, Worms and Vaccines.

UNIT II:**(L-8)**

Operating System –DOS and WINDOWS. Disk Operating System (DOS): Some fundamental DOS Commands, FORMAT, DIR, COPY, PATH, LABEL, VOL, MD, CD and DELTREE, Rules for naming files in DOS and Types of files. WINDOWS: GUI, Desktop and its elements, WINDOWS Explorer, working with files and folders; setting time and date, starting and shutting down of WINDOWS. Anatomy of a WINDOW, Title Bar, Minimum, Maximum and Close Buttons, Scroll Bars, Menus and Tool Bars.

UNIT III:**(L-8)**

Applications –MSWORD: Word, processing and units of document, features of word-processing packages. Creating, Editing, Formatting and Saving a document in MSWORD; MSEXCEL: Electronic Spreadsheets, concept, packages. Creating, Editing and saving a spreadsheet with MSEXCEL.

UNIT IV:**(L-8)**

Use of Data Analysis Tools, Correlation and Regression, t-test for two-samples and ANOVA with One-way Classification. Creating Graphs.

UNIT V:**(L-8)**

MS Power Point: Features of Power Point Package. MSACCESS: Concept of Database, Units of database, creating database; Principles of Programming: Flow Charts and Algorithms, illustration through examples. Internet: World Wide Web (WWW), Concepts, Web Browsing and Electronic Mail.

AG 209	ENVIRONMENTAL SCIENCE (ES)	2L:1T:0P	2 credits
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UNIT I: (L-8)

Scope and importance of environmental studies. Natural resources : Renewable and renewable resources. Forest, Water, Food, energy and land resources.

UNIT II: (L-8)

Ecosystems: Definition, concepts, structure and function. Producers, consumers and decomposes of an ecosystem. Energy flow in the ecosystem. Types of ecosystems. Bio-diversity: Definition, classification, threats to biodiversity and its conservation

UNIT III: (L-8)

Environmental pollution : Causes, effects and control of air, water , soil , thermal, noise and marine pollution. Causes, effects and management of soil nuclear hazards and industrial wastes.

UNIT IV: (L-8)

Disaster management, Floods, earthquakes, cyclones and land slides. Social issues and the environment, unsustainable to sustainable development.

UNIT V: (L-8)

The Environment Protection Act, The Air Act, The water Act, The Wildlife Protection. Act and Forest Conservation Act.

UNIT VI: (L-8)

Woman and child welfare, HIV/AIDS and Role of information technology on environment and human health.

Recommended Books

Environmental Science and Agroecology Dr. S.P. Singh & Dr. M.V.S. Reddy

AG 201(P)	INTRODUCTORY ENTOMOLOGY (IE) LAB	0L:0T:2P	1 credits
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List of Practical:

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(Grassopher); Dissection of male and female reproductive systems in insects (Grassopher); Study of characters of orders Orthoptera, Isoptera, Hemiptera, Lepidoptera, Neuropera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importances.

AG 202(P)	WATER MANAGEMENT INCLUDING MICRO IRRIGATION (WMIMI)LAB	0L:0T:2P	1 credits
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List of Practical:

Determination of bulk density by field method; Determination of soil moisture content by gravimetric method and by tensiometer, Determination of Water holding capacity; Determination of permanent wilting point; Calculation of irrigation water requirement (Problems); Demonstration of furrow method irrigation; Demonstration of check basin and basin method of irrigation; Visit to farmers field and cost estimation of drip irrigation system; Demonstration of filter cleaning; fertigation, injection and flushing of laterals; Erection and operation of sprinkler irrigation system; Determination of EC, pH, carbonates, bicarbonates, Ca^{++} and Mg^{++} in irrigation water (quality paramaters).

AG 203(P)	FUNDAMENTALS OF PLANT PHYSIOLOGY (FPP) LAB	0L:0T:2P	1 credits
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List of Practical:

Study of Plant cells, structure and distribution of stomata, imbibitions, osmosis, plasmolysis, measurement of root pressure, rate of transpiration. Rate of transpiration, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content.

AG 204(P)	FUNDAMENTALS OF AGRICULTURAL ECONOMICS (FAE) LAB	0L:0T:2P	1 credits
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List of Practical:

1. Socio-economic survey and collection of data, classification and tabulation with special reference to natural sources of a village.
2. Study of a farm holding (resources, enterprises, cost, profit & complete farm economy of the allotted farmer by cost accounting method.
3. Preparation of an alternative farm plan for the farmer.
4. Submission of report.
5. Viva- Voice & Practical record.

AG 205(P)	DIMENSIONS OF AGRICULTURAL EXTENSION EDUCATION (DAEE) LAB	0L:0T:2P	1 credits
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List of Practical:

To get acquainted with university extension system. Group discussion- exercise; handling and use of audio visual equipments and LCD projector; preparation and use of AV aids, preparation of extension literature- leaflet, booklet, folder, pamphlet news stories and success stories; A 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 programmed production: script writing , writing for print and electronic media, developing script for radio and television.

AG 206(P)	FUNDAMENTALS OF PLANT PATHOLOGY(FPP) LAB	0L:0T:2P	1 credits
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List of Practical:

Acquaintance with various laboratory equipments and microscopy. Collection and preservation of disease specimen. Preparation of media, isolation and Koch's postulates. Study of symptoms of various plant diseases (at least 10). Study of representative fungal genera. Study of diseases caused by phanerogamic plant parasites. Sampling and extraction of nematodes from soil and plant material, Study of fungicides and their formulations. Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations.

AG 207(P)	FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY (FPB) LAB	0L:0T:2P	1 credits
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List of Practical:

Preparation of solution. pH & buffers, Qualitative tests of carbohydrates and proteins. Quantitative estimation of glucose (Reducing sugar). Composition of various tissue culture media and preparation of stock solution for MS nutrient medium. Callus induction from various ex-plants. Micro-propagation and isolation of DNA by C -Tab method.

AG 208(P)	INTRODUCTION OF COMPUTER APPLICATIONS (ICP)LAB	0L:0T:2P	1 credits
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List of Practical:

Study of Computer Components; Booting of Computer and its Shut Down; Practicing WINDOWS Operating System, Use of Mouse, Title Bar, Minimum, Maximum and Close Buttons, Scroll Bars, Menus and Tool Bars; Creating Folders, COPY and PASTE functions; MSWORD: Creating a Document, Saving and Editing; MSWORD, Use of options from Tool Bars, Format, Insert and Tools (Spelling & Grammar) Alignment of text; MSWORD, Creating a Table, Merging of Cells, Column and Row width; MSEXCEL: Creating a Spreadsheet, Alignment of rows, columns and cells using Format tool bar; MSEXCEL: Entering Expressions through the formula tool bar and use of inbuilt functions, SUM, AVERAGE, STDEV; MSEXCEL: Data Analysis using inbuilt Tool Packs, Correlation & Regression; MSEXCEL: Creating Graphs and Saving with & without data; MSACCESS: Creating Database, Structuring with different types of fields; MS Power Point: Preparation of slides on Power Point; Transforming the data of WORD, EXCEL and ACCESS to other formats; Internet Browsing: Browsing a Web Page and Creating of E-Mail ID