

B.Sc. (AGRICULTURE)

(A FOUR YEAR DEGREE PROGRAMME)

COURSE CURRICULUM

AND

SYLLABUS

BASED ON 5TH DEANS COMMITTEE REPORT OF
ICAR, NEW DELHI



DEPARTMENT OF AGRICULTURE

SRK UNIVERSITY

BHOPAL-462026

(M.P)

B.Sc. (Ag.) COURSES

AT A GLANCE



S.NO	COURSES	CREDITE
A.	COMPULSORY COURSES	135
B.	ELECTIVE COURSES	09
C.	RURAL AGRICULTURAL WORK EXPERIENCE PROGRAMME(RAWE)	20
D.	EXPERIENCIAL LEARNING PROGRAMME (ELP)	20
GRANT TOTAL		184

DEPARTMENT OF AGRICULTURE

SRK UNIVERSITY, BHOPAL

B.Sc. (Agriculture)

First Semester

Semester- wise distribution of courses

I Semester			
S.NO.	SUBJECT TITLE	CODE	CREDIT
1.	Fundamentals of Horticulture	AG-101T	2 (1+1)
2.	Fundamentals of Plant Biochemistry and Biotechnology	AG-102T	3(2+1)
3.	Fundamentals of Soil Science	AG-103T	3(2+1)
4.	Introduction to Forestry	AG-104T	2 (1+1)
5.	Fundamentals of Agronomy	AG-105T	4(3+1)
6.	Comprehension & Communication Skills in English	AG-106T	2 (1+1)
7.	Rural Sociology & Educational Psychology	AG-107T	2 (2+1)
8.	Introductory Biology*	AG-108T	2 (1+0)*
9.	Elementary Mathematics*	AG-109T	2(2+0)*
10.	Agriculture Heritage*	AG-110T	1(1+0)*
11.	Human Values & Ethics **	AG-111T	1(1+0)**
12.	NSS/NCC/Physical Education & Yoga Practices**	AG-112P	2 (0+2)**
TOTAL			18+08(05*+03**)
*R: Remedial course; **NG: Non-gradial courses			

Department of Agriculture, SRK University, BHOPAL

B.Sc. (Ag.) IST SEMESTER Syllabus

Fundamentals of Horticulture 2(1+1)

Theory

Unit-1 Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops;

Unit-2 Plant propagation-methods and propagating structures; Seed dormancy, Seed germination, principles of orchard establishment;

Unit-3 Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness;

Unit-4 Pollination, pollinizers and pollinators; fertilization and parthenocarpy; medicinal and aromatic plants; importance of plant bio-regulators in horticulture.

Unit-5 Irrigation – methods, Fertilizer application in horticultural crops.

Practical:

Identification of garden tools. Identification of horticultural crops. Preparation of seed bed/nursery bed. Practice of sexual and asexual methods of propagation including micro-propagation. Layout and planting of orchard. Training and pruning of fruit trees. Preparation of potting mixture. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

Fundamentals of Plant Biochemistry and Biotechnology 3(2+1)

Theory

- Unit-1** Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation; Structure of Disaccharides and Polysaccharides. Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids. Proteins: Importance of proteins and classification; Structures, titration and zwitterions nature of amino acids; Structural organization of proteins.
- Unit-2** Enzymes: General properties; Classification; Mechanism of action; Michaelis & Menten and Line Weaver Burk equation & plots; Introduction to allosteric enzymes. Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.
- Unit-3** Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications;
- Unit-4** Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; Embryo rescue and its significance; somatic hybridization and cybrids; Somaclonal variation and its use in crop improvement; cryo-preservation;
- Unit-5** Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods; Transgenics and its importance in crop improvement; PCR techniques and its applications; RFLP, RAPD, SSR; Marker Assisted Breeding in crop improvement; Biotechnology regulations.

Practical:

Preparation of solution, pH & buffers, Qualitative tests of carbohydrates and amino acids. Quantitative estimation of glucose/ proteins. Titration methods for estimation of amino acids/lipids, Effect of pH, temperature and substrate concentration on enzyme action, Paper chromatography/ TLC demonstration for separation of amino acids/ Monosaccharides. Sterilization techniques. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium. Callus induction from various explants. Micro-propagation, hardening and acclimatization. Demonstration on isolation of DNA. Demonstration of gel electrophoresis techniques and DNA finger printing.

Fundamentals of Soil Science 3(2+1)

Theory

- Unit-1** Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile, components of soil;
- Unit-2** Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; Elementary knowledge of soil taxonomy classification and soils of India; Soil water retention, movement and availability;
- Unit-3** Soil air, composition, gaseous exchange, problem and plant growth, Soil temperature; source, amount and flow of heat in soil; effect on plant growth, Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability;
- Unit-4** soil colloids - inorganic and organic; silicate clays: constitution and properties; sources of charge; ion exchange, cation exchange capacity, base saturation;
- Unit 5** soil organic matter: composition, properties and its influence on soil properties; humic substances - nature and properties; soil organisms: macro and micro organisms, their beneficial and harmful effects; Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation of soil pollution.

Practical

Study of soil profile in field. Study of soil sampling tools, collection of representative soil sample, its processing and storage. Study of soil forming rocks and minerals. Determination of soil density, moisture content and porosity. Determination of soil texture by feel and Bouyoucos Methods. Studies of capillary rise phenomenon of water in soil column and water movement in soil. Determination of soil pH and electrical conductivity. Determination of cation exchange capacity of soil. Study of soil map. Determination of soil colour. Demonstration of heat transfer in soil. Estimation of organic matter content of soil.

Introduction to Forestry (New) 2(1+1)

Theory

- Unit-1** Introduction – definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies. Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers;
- Unit-2** Artificial regeneration – objectives, choice between natural and artificial regeneration, essential preliminary considerations. Crown classification. Tending operations – weeding, cleaning, thinning – mechanical, ordinary, crown and advance thinning.
- Unit-3** Forest mensuration – objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement - shadow and single pole method; Instrumental methods of height measurement - geometric and trigonometric principles, instruments used in height measurement; tree stem form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees.
- Unit-4** Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens.
- Unit-5** Cultivation practices of two important fast growing tree species of the region.

Practical

Identification of tree-species. Diameter measurements using calipers and tape, diameter measurements of forked, buttressed, fluted and leaning trees. Height measurement of standing trees by shadow method, single pole method and hypsometer. Volume measurement of logs using various formulae. Nursery lay out, seed sowing, vegetative propagation techniques. Forest plantations and their management. Visits of nearby forest based industries.

Comprehension and Communication Skills in English 2(1+1)

Theory

Unit-1 War Minus Shooting- The sporting Spirit. A Dilemma- A layman looks at science Raymond B. Fosdick. You and Your English – Spoken English and broken English G.B. Shaw.

Unit-2 Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words.

Unit-3 Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations. Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect Narration. Written Skills: Paragraph writing,

Unit-4 Precise writing, Report writing and Proposal writing. The Style: Importance of professional writing.

Unit-5 Preparation of Curriculum Vitae and Job applications. Synopsis Writing. Interviews: kinds, Importance and process.

Practical:

Listening Comprehension: Listening to short talks lectures, speeches (scientific, commercial and general in nature). Oral Communication: Phonetics, stress and intonation, Conversation practice. Conversation: rate of speech, clarity of voice, speaking and Listening, politeness & Reading skills: reading dialogues, rapid reading, intensive reading, improving reading skills. Mock Interviews: testing initiative, team spirit, leadership, intellectual ability. Group Discussions.

Fundamentals of Agronomy 4(3+1)

Theory

Unit-1 Agronomy and its scope, seeds and sowing, tillage and tith, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources,

Unit-2 Soil-plant-water relationship, crop water requirement, water use efficiency, irrigation-scheduling criteria and methods, quality of irrigation water, logging.

Unit-3 Weeds- importance, classification, crop weed competition, concepts of weed management principles and methods, herbicides- classification, selectivity and resistance, allelopathy.

Unit-4 Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles, adaptation and distribution of crops,

Unit-5 Crop management technologies in problematic areas, harvesting and threshing of crops.

Practical:

Identification of crops, seeds, fertilizers, pesticides and tillage implements, study of agro-climatic zones of India, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill, Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

Introductory Biology (New) 2(1+1)

Theory

Unit-1 Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics.

Unit-2 Binomial nomenclature and classification Cell and cell division.

Unit-3 Morphology of flowering plants.

Unit-4 Seed and seed germination. Plant systematic-viz; Brassicaceae, Fabaceae and Poaceae.

Unit-5 Role of animals in agriculture.

Practical:

Morphology of flowering plants – root, stem and leaf and their modifications. Inflorescence, flower and fruits. Cell, tissues & cell division. Internal structure of root, stem and leaf. Study of specimens and slides. Description of plants - Brassicaceae, Fabaceae and Poaceae.

Elementary Mathematics (New) 2(2+0)

Theory

- Unit-1** Straight lines : Distance formula, section formula (internal and external division), Change of axes (only origin changed), Equation of co-ordinate axes, Equation of lines parallel to axes, Slope-intercept form of equation of line, Slope-point form of equation of line, Two point form of equation of line,
- Unit-2** Intercept form of equation of line, Normal form of equation of line, General form of equation of line, Point of intersection of two st. lines, Angles between two st. lines, Parallel lines, Perpendicular lines, Angle of bisectors between two lines, Area of triangle and quadrilateral. Circle: Equation of circle whose centre and radius is known,
- Unit-3** General equation of a circle, Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points (x_1, y_1) & (x_2, y_2) , Tangent and Normal to a given circle at given point (Simple problems), Condition of tangency of a line $y = mx + c$ to the given circle $x^2 + y^2 = a^2$. Differential Calculus : Definition of function, limit and continuity, Simple problems on limit, Simple problems on continuity, Differentiation of x^n , e^x , $\sin x$ & $\cos x$ from first principle,
- Unit-3** Derivatives of sum, difference, product and quotient of two functions, Differentiation of functions of functions (Simple problem based on it), Logarithmic differentiation (Simple problem based on it), Differentiation by substitution method and simple problems based on it, Differentiation of Inverse Trigonometric functions. Maxima and Minima of the functions of the form $y=f(x)$ (Simple problems based on it). Integral Calculus : Integration of simple functions, Integration of Product of two functions, Integration by substitution method, Definite Integral (simple problems based on it),
- Unit-5** Area under simple well-known curves (simple problems based on it). Matrices and Determinants: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose and Inverse up to 3rd order, Properties of determinants up to 3rd order and their evaluation.

Agricultural Heritage (New Course) 1(1+0)

Theory

- Unit-1** Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture;
- Unit-2** Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era;
- Unit-3** Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world;
- Unit-3** Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and classifications;
- Unit-4** National agriculture setup in India; Current scenario of Indian agriculture;
- Unit-5** Indian agricultural concerns and future prospects.

Rural Sociology & Educational Psychology 2(2+0)

Theory

- Unit-1** Sociology and Rural sociology: Definition and scope, its significance in agriculture extension,
- Unit-2** Social Ecology, Rural society, Social Groups, Social Stratification, Culture concept,
- Unit-3** Social Institution, Social Change & Development.
- Unit-4** Educational psychology: Meaning & its importance in agriculture extension.
- Unit-5** Behavior: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation, Theories of Motivation, Intelligence

Human Value and Ethics 1(1+0)

Theory

Unit-1 Values and Ethics-An Introduction. Goal and Mission of Life.

Unit-2 Vision of Life. Principles and Philosophy. Self Exploration. Self Awareness. Self Satisfaction.

Unit-3 Decision Making. Motivation. Sensitivity. Success.

Unit-4 Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul.

Unit- 5 Attachment and Detachment. Spirituality Quotient. Examination

Course Title: National Service Scheme

I Introduction and basic components of NSS: Orientation: history, objectives, principles, symbol, badge; regular programmes under NSS, organizational structure of NSS, code of conduct for NSS volunteers, points to be considered by NSS volunteers awareness about health

NSS programmes and activities

Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analysing guiding financial patterns of scheme, youth programme/ schemes of GOI, coordination with different agencies and maintenance of diary

Understanding youth

Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change

Community mobilization

Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilisation involving youth-adult partnership

Social harmony and national integration

Indian history and culture, role of youth in nation building, conflict resolution and peace building

Volunteerism and shramdan

Indian tradition of volunteerism, its need, importance, motivation and constraints; shramdan as part of volunteerism

Citizenship, constitution and human rights

Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information

Family and society

Concept of family, community (PRIs and other community based organisations) and society

Examination and Evaluation System

Fifth Deans' Committee deliberated on the examination and evaluation system being followed by different universities. The Committee recommends Uniform Grading system to be followed with uniform OGPA requirements for award of degrees at all levels and uniform conversion formulae to be followed for declaration of I, II and III divisions, distinctions etc. Declaration of division in the degree certificate to be made compulsory. by all universities:

1. Examination

- External theory (50%)
- Internal Theory + Practical (50%)

- Courses with theory and practical

Mid-term Exam (30%) + Assignment (5%) in practical oriented courses + Practical (15%)

- Courses with only theory

Mid-term Exam (40%) + Assignment (10%)

- Courses with only practical:

(100%) Internal

- Paper to be set by external: HOD shall ensure the coverage of syllabus. If needed moderation can be done.
- Evaluation to be done internally by the faculty other than the Course Instructor. Syllabus of the concerned course shall be sent to the external examiner, who shall prepare the question papers. For practical, it is recommended that examination shall be conducted by course instructor(s) and one teacher nominated by HOD.

2. Evaluation

Degree	Percentage of Marks Obtained	Conversion into Points
All	100	10 Points
	90 to <100	9 to <10
	80 to <90	8 to <9
	70 to <80	7 to <8
	60 to <70	6 to <7
	50 to <60	5 to <6
	<50 (Fail)	<5
	Eg. 80.76	8.076
	43.60	4.360
	72.50 (but shortage in attendance)	Fail (1 point)

OGPA	Division
5.000 – 5.999	Pass
6.000 – 6.999	II division
7.000 – 7.999	I division
8.000 and above	division with distinction

GPA = Total points scored / Total credits (for 1 semester)

CGPA = \sum Total points scored / Course credits

OGPA = \sum Total points scored (after excluding failure points) / Course credits

% of Marks = OGPA x 100/10

Semester -I

S.N	Course code	Credit of the course	Name of the course	Internal Assessment		Assignment		End Semester exams		Practical exams		Total Marks
				Max. Marks	Min. Marks	Max. Marks	Mini. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	AG-101A	2 (1+1)	Fundamentals of Horticulture	30	15	-	-	50	25	20	10	100
2	AG-102A	3(2+1)	Fundamentals of Plant Biochemistry and Biotechnology	30	15	-	-	50	25	20	10	100
3	AG-103A	3(2+1)	Fundamentals of Soil Science	30	15	-	-	50	25	20	10	100
4	AG-104A	2 (1+1)	Introduction to Forestry	30	15	-	-	50	25	20	10	100
5	AG-105A	4(3+1)	Fundamentals of Agronomy	30	15	-	-	50	25	20	10	100
6	AG-106A	2 (1+1)	Comprehension & Communication Skills in English	30	15	-	-	50	25	20	10	100
7	AG-107A	2 (1+1)	Rural Sociology & Educational Psychology	30	15	5	5	50	25	20	10	100
8	AG-108A	2 (2+0)*	Introductory Biology*	40	20	10	5	50	25	10	5	100
9	AG-109A	1(1+0)*	Elementary Mathematics*	40	20	10	5	50	25	10	5	100
10	AG-110A	2(2+0)*	Agriculture Heritage*	40	20	10	5	50	25	10	5	100
11	AG-111A	1(1+0)**	Human Values & Ethics **	40	20	10	5	50	25	10	5	100
12	AG-112A	2(0+2)**	NSS/NCC/Physical Education & Yoga Practices**	-	-	10	5	-	-	100	50	100
			Minimum Marks	-	185	-	20	-	275	-	120	600
	Total	18+04*/03*+03**	Maximum Marks	370	-	40	-	550	-	240	-	1200

*R: Remedial course; **NC: Non-gradual courses

- Remedial course for agri student
- Remedial course for bio student
- Remedial course for maths student

DEPARTMENT OF AGRICULTURE

SRK UNIVERSITY, BHOPAL

B.Sc. (Agriculture)

Second Semester

Semester- wise distribution of courses

II Semester			
S.NO.	SUBJECT TITLE	CODE	CREDIT
13.	Fundamentals of Genetics	AG-201	3(2+1)
14.	Agricultural Microbiology	AG-202	2(1+1)
15.	Soil and Water Conservation Engineering	AG-203	2(1+1)
16.	Fundamentals of Crop Physiology	AG-204	2(1+1)
17.	Fundamentals of Agricultural Economics	AG-205	2(2+0)
18.	Fundamentals of Plant Pathology	AG-206	4(3+1)
19.	Fundamentals of Entomology	AG-207	4(3+1)
20.	Fundamentals of Agricultural Extension Education	AG-208	3(2+1)
21.	Communication Skills and Personality Development	AG-209	2(1+1)
	Total		24(16+8)

Department of Agriculture, SRK University, Bhopal

B.Sc. (Ag.) IInd SEMESTER Syllabus

Fundamentals of Genetics 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.

Unit-2:- Chromosomal theory of inheritance- cell cycle and cell division- mitosis and meiosis. Probability and Chi-square. Dominance relationships, 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.

Unit-3:- Structural and numerical variations in chromosome and their implications, Use of haploids, dihaploids and doubled haploids in Genetics. Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation.

Unit-4:- Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance. Genetic disorders.

Unit-5:- 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.

Agricultural Microbiology 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.

Unit-4:-Biological nitrogen fixation- symbiotic, associative and asymbiotic. Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere.

Unit-5:-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.

Introductory Soil and Water Conservation Engineering 2(1+1)

Theory

Unit-1:-Introduction to Soil and Water Conservation, causes of soil erosion. Definition and agents of soil erosion, water erosion:

Unit-2:-Forms of water erosion. Gully classification and control measures. Soil loss estimation by universal Loss Soil Equation.

Unit-3:-Soil loss measurement techniques. Principles of erosion control: Introduction to contouring, strip cropping. Contour bund.

Unit-4:-Graded bund and bench terracing. Grassed water ways and their design. Water harvesting and its techniques.

Unit-5:-Winderosion: 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.

Fundamentals of Crop Physiology 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;

Unit-3:-Photosynthesis: Light and Dark reactions, C₃, C₄ and CAM plants; 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,

Unit-5:-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).

Fundamentals of Agricultural Economics 2(2+0)

Theory

Unit-1:-Economics: Meaning, scope and subject matter, definitions, activities, approaches to economic analysis; micro and macro economics, positive and normative analysis.

Unit-2:-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-3:-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. Production: process, creation of utility, factors of production, input output relationship.

Unit-4:-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. 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.

Unit-5:-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. 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.

Fundamentals of Plant Pathology 4(3+1)

Theory

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.

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, subdivisions, orders and classes. *Bacteria and mollicutes:* general morphological characters. Basic methods of classification and reproduction.

Unit-3:-Viruses: nature, structure, replication and transmission. Study of phanerogamic plant parasites. *Nematodes:* General morphology and reproduction, classification, symptoms and nature of damage caused by plant nematodes (*Heterodera, Meloidogyne, Anguina, Radopholus* etc.) Growth and reproduction of plant pathogens. Liberation / dispersal and survival of plant pathogens.

Unit-4:-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.

Practical

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.

Fundamentals of Entomology 4(3+1)

Theory:

Unit-I 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. 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. Metamorphosis and diapause 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.

Unit-II 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.

Unit- III Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical control 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-IV 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;

Unit –V Lepidoptera: Pieridae, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturniidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthredinidae, Apidae, Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.

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 (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.

Fundamentals of Agricultural Extension Education 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.

Unit-2:-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-3:-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. Community Dev.-meaning, definition, concept & principles, Philosophy of C.D. Rural

Unit-4:-Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, 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.

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; scriptwriting, writing for print and electronic media, developing script for radio and television.

Communication Skills and Personality Development 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;

Unit-4:-individual and group presentations, impromptu presentation, public speaking; Group discussion.

Unit-5:-Organizing seminars and conferences.

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.

**DEPARTMENT OF AGRICULTURE
SRK UNIVERSITY, BHOPAL (M.P.)**

**PROGRAMME STRUCTURE
ACADMIC SESSION: 2018-19**

B.Sc. Agriculture Second Semester
Subject Wise Distribution of marks and corresponding Credit

Semester -II

S.N.	Course code	Credit of the course	Name of the course	Internal Assessment		Assignment		End Semester exams		Practical exams		Total marks
				Max. Marks	Min. Marks	Max. Marks	Mini. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	AG-201	3(2+1)	Fundamentals of Genetics	30	15	-	-	50	25	20	10	100
2	AG-202	2(1+1)	Agricultural Microbiology	30	15	-	-	50	25	20	10	100
3	AG-203	2(1+1)	Soil and Water Conservation Engineering	30	15	-	-	50	25	20	10	100
4	AG-204	2(1+1)	Fundamentals of Crop Physiology	30	15	-	-	50	25	20	10	100
5	AG-205	2(2+0)	Fundamentals of Agricultural Economics	40	20	10	5	50	25	-	-	100
6	AG-206	4(3+1)	Fundamentals of Plant Pathology	30	15	-	-	50	25	20	10	100
7	AG-207	4(3+1)	Fundamentals of Entomology	30	15	-	-	50	25	20	10	100
8	AG-208	3(2+1)	Fundamentals of Agricultural Extension Education	30	15	-	--	50	25	20	10	100
9	AG-209	2(1+1)	Communication Skills and Personality Development	30	15	-	--	50	25	20	10	100
			Minimum Marks	-	140	-	5	-	225	-	80	450
Total		24 (16+8)	Maximum Marks	280	-	10	-	450	-	160	-	900

DEPARTMENT OF AGRICULTURE

SRK UNIVERSITY, BHOPAL

B. Sc. Agriculture

List of Subjects

Semester- wise distribution of courses

III Semester			
S.NO.	SUB. CODE	SUBJECT TITLE	CREDIT
1	AG-301	Crop Production Technology-I (Kharif Crops)	2(1+1)
2	AG-302	Fundamentals of Plant Breeding	3(2+1)
3	AG-303	Agricultural Finance and Co-Operation	3(2+1)
4	AG-304	Agri-Informatics	2(1+1)
5	AG-305	Farm Power and Machinery	2(1+1)
6	AG-306	Production Technology for Vegetable and Spices	2(1+1)
7	AG-307	Environmental Studies and Disaster Management	3(2+1)
8	AG-308	Statistical Methods	2(1+1)
9	AG-309	Livestock & Poultry Management	4(3+1)
Total Credit			23(14+09)

Department of Agriculture, SRK University, Bhopal

B.Sc. (Ag.) IIIrd SEMESTER Syllabus

Crop Production Technology-I (Kharif Crops) 2(1+1)

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of the following kharif crops.

Unit- I: - Cereals – rice, maize, sorghum, pearl millet and finger millet. (25%)

Unit- II: - Pulses- pigeonpea, mungbean and urdbean. (20%)

Unit- III: - Oilseeds- groundnut, and soybean. (15%)

Unit- IV: - Fiber crops- cotton & jute (15%)

Unit- V: - Forage crops-sorghum, cowpea, cluster bean and napier. (25%)

Practicals:

1. To study of rice nursery preparation, and transplanting of rice.
2. To identification of weeds in kharif season crops.
3. To study about methods nutrient application in crops.
4. To study of yield contributing characters and yield calculation of kharif season crops
5. Effect of seed size on germination and seedling vigour of kharif season crops,
6. Effect of sowing depth on germination of kharif crops, ,
7. Study of crop varieties and important agronomic experiments at experimental farm.
8. Study of forage experiments, morphological description of kharif season crops, visit to research centers of related crops.

Fundamentals of Plant Breeding 3(2+1)

Theory

Unit-I:- Historical development, concept, nature and role of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding modes of reproduction and apomixes, self-incompatibility and male sterility- genetic consequences, cultivar options. **(20%)**

Unit-II:-Domestication, Acclimatization and Introduction; Centers of origin/diversity, components of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops - mass and pure line selection, hybridization techniques and handling of segregating population; **(20%)**

Unit-III:-Multiline concept. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection; Population improvement Schemes-Ear to row method, Modified Ear to Row, recurrent selection schemes. **(20%)**

Unit-IV:-Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Maintenance of breeding records and data collection. **(20%)**

Unit-V:- Wide hybridization and prebreeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Breeding for important biotic and abiotic stresses; Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Intellectual Property Rights, Patenting, Plant Breeders and & Farmer's Rights. **(20%)**

Practicals:

1. Plant Breeder's kit, Study of germplasm of various crops.
2. Study of floral structure of self-pollinated and cross pollinated crops.
3. Emasculation and hybridization techniques in self & cross pollinated crops.
4. Consequences of inbreeding on genetic structure of resulting populations.
5. Study of male sterility system.
6. Handling of segregation populations.
7. Methods of calculating mean, range, variance, standard deviation, heritability.
8. Designs used in plant breeding experiments, analysis of Randomized Block Design.

Agricultural Finance and Co-Operation 3(2+1)

Theory

- Unit-I:** - Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits. **(20%)**
- Unit-II:** - Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC. **(15%)**
- Unit-III:** - Lead bank scheme, RRBs, Scale of finance and unit cost. An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank, Insurance and Credit Guarantee Corporation of India. **(20%)**
- Unit-IV:** - Cost of credit. Recent development in agricultural credit. Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of project reports- Bank norms – SWOT analysis. **(20%)**
- Unit-V:** - Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture. Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED. **(25%)**

Practicals:

1. Determination of most profitable level of capital use.
2. Optimum allocation of limited amount of capital among different enterprise.
3. Visit to a commercial bank, cooperative bank and cooperative society to acquire
4. Firsthand knowledge of their management, schemes and procedures.
5. Estimation of credit requirement of farm business – A case study.
6. Preparation and analysis of balance sheet – A case study.
7. Preparation and analysis of income statement – A case study.
8. Appraisal of a loan proposal – A case study.

Agri-Informatics 2(1+1)

Theory

Unit-I:- Introduction to Computers, Operating Systems, definition and types, Applications of MS Office for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, **(25%)**

Unit-II:-World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations. **(15%)**

Unit-III:-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, **(27%)**

Unit-IV:-Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology for generating valuable agri-information. **(10%)**

Unit-V:-Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning using IT tools. **(23%)**

Practicals

1. 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.
2. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document.
3. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data.
4. MS-ACCESS: Creating Database, preparing queries and reports,
5. Introduction to World Wide Web (www).
6. Introduction of programming languages.
7. Introduction of Geospatial Technology for generating valuable information for Agriculture. Hands on Decision Support System.

Farm Power and Machinery 2(1+1)

Theory

Unit-I:- Status of Farm Power in India, Sources of Farm Power, I.C. engines, working principles of I.C. engines, comparison of two stroke and four stroke cycle engines, **(15%)**

Unit-II: - Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor, **(25%)**

Unit-III:- Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor , Tractor types, Cost analysis of tractor power and attached implement, **(20%)**

Unit-IV: - Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, **(25%)**

Unit-V: - Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment. **(15%)**

Practicals:

1. To Study of different components of I.C. engine.
2. To study air cleaning and cooling system of engine.
3. To study about different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow.
4. Familiarization with different types of sprayers and dusters Familiarization.
5. To study about different inter-cultivation equipment, Familiarization with harvesting and threshing machinery.
6. Familiarization with seed cum- fertilizer drills their seed metering mechanism and calibration, planters and transplanter.

Production Technology for Vegetable and Spices 2 (1+1)

Theory

Unit-I: - Importance of vegetables & spices in human nutrition and national economy, kitchen gardening,

brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of following vegetable and spices **(45%)**

Unit-II: - Tomato, Brinjal, Chilli, Capsicum, Cucumber, Melons, Gourds, Pumpkin, French bean, Peas. (30%)

Unit-III: - Cole crops - Cabbage, Cauliflower, Knol-khol. Tuber crops – Potato. **(25%)**

Unit-IV: - Bulb crops - Onion, Garlic. Root crops -Carrot, Raddish, Beetroot. **(15%)**

Unit-V: - Leafy vegetables such as Amaranth, Palak. Perennial vegetables. **(15%)**

Practicals:

1. Identification of vegetables & spice crops and their seeds.
2. Nursery rising. Direct seed sowing and transplanting.
3. Study of morphological characters of different vegetables & spices.
4. Fertilizers applications of different vegetables.
5. Harvesting & preparation for market.
6. Economics of vegetables and spices cultivation.

Environmental Studies and Disaster Management 3 (2+1)

Theory

Unit I: - Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. d) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. **(25%)**

Unit II: - Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). **(15%)**

Unit III: - Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. **(20%)**

Unit IV:- Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. **(15%)**

Unit V: - Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion.

Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community –based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations. (25%)

Practicals:

1. Pollution case studies.
2. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain,
3. Visit to a local polluted site-Urban/Rural/Industrial/ Agricultural,
4. Study of common plants,
5. Study of insects, birds
6. Study of simple ecosystems-pond, river, hill slopes, etc.

Statistical Methods 2(1+1)

Theory

Unit I: - Introduction to Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency & Dispersion, **(17%)**

Unit II: - Definition of Probability, Addition and Multiplication Theorem (without proof). Simple Problems Based on Probability. Binomial & Poisson Distributions, **(20%)**

Unit III: - Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations. **(15%)**

Unit IV:- Introduction to Test of Significance, One sample & two sample test t for Means, Chi-Square Test of Independence of Attributes in 2×2 Contingency Table. Introduction to Analysis of Variance, Analysis of One Way Classification. **(23%)**

Unit V:- Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement, Use of Random Number Tables for selection of Simple Random Sample. **(15%)**

Practicals:

1. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles
2. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles.
3. Correlation & Regression Analysis.
4. Application of One Sample t-test.
5. Application of Two Sample Fisher's t-test.
6. Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for 2×2 contingency table.
7. Analysis of Variance One Way Classification. Analysis of Variance Two Way Classification. Selection of random sample using Simple Random Sampling.

Livestock & Poultry Management 4 (3+1)

Theory

Unit-I: - Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. (20%)

Unit-II: -Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. (20%)

Unit-III: - Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry. Digestion in livestock and poultry. Classification of feedstuffs. (20%)

Unit-IV: - Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry. (20%)

Unit-V: - Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry. (20%)

Practicals:

1. External body parts of cattle, buffalo, sheep, goat, swine and poultry.
2. Handling and restraining of livestock. Identification methods of farm animals and poultry.
3. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records.
4. Judging of cattle, buffalo and poultry. Culling of livestock and poultry.
5. Planning and layout of housing for different types of livestock.
6. Computation of rations for livestock. Formulation of concentrate mixtures.
7. Clean milk production, milking methods.
8. Hatchery operations, incubation and hatching equipments.
9. Management of chicks, growers and layers.
10. Debeaking, dusting and vaccination.
11. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

Semester -III

S.N.	Course code	Credit of the course	Name of the course	Internal Assessment		Assign ment		End Semester exams		Practical exams		Total marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	AG-301	2(1+1)	Crop Production Technology-I (Kharif Crops)	30	15	-	-	50	25	20	10	100
2	AG-302	3(2+1)	Fundamentals of Plant Breeding	30	15	-	-	50	25	20	10	100
3	AG-303	3(2+1)	Agricultural Finance and Co-Operation	30	15	-	-	50	25	20	10	100
4	AG-304	2(1+1)	Agri-Informatics	30	15	-	-	50	25	20	10	100
5	AG-305	2(1+1)	Farm Power and Machinery	30	15	-	-	50	25	20	10	100
6	AG-306	3(2+1)	Production Technology for Vegetable and Spices	30	15	-	-	50	25	20	10	100
7	AG-307	3(2+1)	Environmental Studies and Disaster Management	30	15	-	-	50	25	20	10	100
8	AG-308	2(1+1)	Statistical Methods	30	15	-	-	50	25	20	10	100
9	AG-309	4(3+1)	Livestock & Poultry Management	30	15	-	-	50	25	20	10	100
			Minimum Marks	-	135	-	-	-	225	-	90	450
		23 (14+9)	Maximum Marks	270	-	-	-	450	-	180	-	900

Note: Core/ Electives etc must be of minimum 20 Credits; M- MOOCs, Subjects etc are indicative only as example.

VAC Courses:

- i. Comprehensive and Communication Skill in English
- ii. Personality Development & Etiquettes
- iii. Human Values and Ethics (Compulsory)
- iv. NSS/NCC/Physical Education/Yoga Practices
- v. Foreign Language
- vi. Behavioral Science
- vii. Computing

This has been approved by Hon'ble Chancellor on 20/07/2018

DEPARTMENT OF AGRICULTURE

SRK UNIVERSITY, BHOPAL

B.Sc. Agriculture

List of Subjects

IV Semester			
S.NO.	SUB. CODE	SUBJECT TITLE	CREDIT
1	AG-401	Crop Production Technology-II (Rabi crops)	2(1+1)
2	AG-402	Production Technology for Ornamental Crops, MAPs and Landscaping	2(1+1)
3	AG-403	Renewable Energy and Green Technology	2(1+1)
4	AG-404	Problematic Soils and their Management (New)	2(2+0)
5	AG-405	Production Technology for Fruit and Plantation Crops	2(1+1)
6	AG-406	Principles of Seed Technology	3(2+1)
7	AG-407	Farming System and Sustainable Agriculture	1(1+0)
8	AG-408	Agricultural Marketing, Trade and Prices	3(2+1)
9	AG-409	Introductory Agro-meteorology & Climate Change	2(1+1)
10	AG-410	Elective Course	3Credit
Total Credit			22(12+07)+3

Department of Agriculture
SRK University, Bhopal
Syllabus

B.Sc. (Ag.) IV SEMESTER

Crop Production Technology-II (Rabi crops) 2(1+1)

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Rabi* crops-

Unit I:- cereals –wheat and barley (15%)

Unit II:- pulses-chickpea, lentil, peas, (15%)

Unit II:- oilseeds-rapeseed, mustard and sunflower.(20%)

Unit IV:- sugar crops-sugarcane, Forage crops-berseem, lucerne and oat. (25%)

Unit V:- medicinal and aromatic crops-mentha, lemon grass and citronella.(25%)

Practical-

1. Sowing methods of wheat and sugarcane,
2. Identification of weeds in *rabi* season crops,
3. Study of morphological characteristics of *rabi* crops,
4. Study of yield contributing characters of *rabi* season crops,
5. Yield and juice quality analysis of sugarcane,
6. Study of important agronomic experiments of *rabi* crops at experimental farms.
7. Study of *rabi* forage experiments, oil extraction of medicinal crops,
8. visit to research stations of related crops.

Reference-

Field crop – Chhidda Singh

शस्य विज्ञान के सिद्धांत - ओमप्रकाश अहलावद

Production Technology for Ornamental Crops, MAPs and Landscaping 2 (1+1)

Theory

Unit I: - Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers. **(20%)**

Unit II: - Production technology of important cut flowers like rose, gerbera, carnation, liliun and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. **(25%)**

Unit III: - Package of practices for loose flowers like marigold and jasmine under open conditions. **(15%)**

Unit IV:- Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. **(25%)**

Unit V: - Processing and value addition in ornamental crops and MAPs produce. **(15%)**

Practical

1. Identification of Ornamental plants, Medicinal and Aromatic Plants.
2. Nursery bed preparation and seed sowing.
3. Training and pruning of Ornamental plants.
4. Planning and layout of garden.
5. Bed preparation and planting of MAP.
6. Intercultural operations in flowers and MAP.
7. Harvesting and post harvest handling of cut and loose flowers.
8. Visit to commercial flower/MAP unit.

Reference-

M. S. Randhawa

K. V. Peter

Basic Horticulture – Jitendra Singh

Renewable Energy and Green Technology 2(1+1)

Theory

Unit I: - Classification of energy sources, contribution of these of sources in agricultural sector, familiarization with biomass utilization for biofuel production and their application. **(25%)**

Unit II: - Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource. . **(25%)**

Unit III: - Introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater. . **(20%)**

Unit IV: - Application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application. . **(20%)**

Unit V: - Introduction of wind energy and their application. . **(10%)**

Practical

1. To study biogas plants.
2. To study gasifier,
3. To study the production process of biodiesel,
4. To study the production process of bio-fuels.
5. To study solar cooker,
6. To study solar drying system.
7. To study solar distillation and solar pond.

Problematic Soils and their Management (New) 2(2+0)

Theory

Unit-I: - Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. . (20%)

Unit-II: - Reclamation and management of Saline and sodic soils, Acidsoils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils. . (25%)

Unit-III: - Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils. . (25%)

Unit-IV: - Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. . (20%)

Unit-V: - Problematic soils under different Agro-ecosystems. . (10%)

Reference-

Introductory Soil Science- D. K. Das

मृदा विज्ञान - डॉ विनय सिंह

Production Technology for Fruit and Plantation Crops 2(1+1)

Theory

Unit-I: - Importance and scope of fruit and plantation crop industry in India. . (20%)

Unit-II: - Importance of rootstocks; Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, . (25%)

Unit-III: - Sapota, apple, pear, peach, walnut, almond . (20%)

Unit-IV: - Minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberry, . (20%)

Unit-V: - Plantation crops-coconut, areca nut, cashew, tea, coffee & rubber. . (15%)

Practical

1. Seed propagation.
2. Scarification and stratification of seeds.
3. Propagation methods for fruit and plantation crops.
4. Description and identification of fruit.
5. Preparation of plant bio regulators and their uses,
6. Important pests, diseases and physiological disorders of above fruit and plantation crops,
7. Visit to commercial orchards.

Reference-

Production and Protection of Horticulture crops – K V Peter
Fruit Production Technology – Amar Singh & Anand Kumar

Principles of Seed Technology 3(1+2)

Theory

Unit-I: - Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; **(20%)**

Unit-II: - Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important **cereals, pulses, oilseeds, fodder and vegetables**. Seed certification, phases of certification, procedure for seed certification, field inspection. . **(20%)**

Unit-III: - Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. . **(20%)**

Unit-IV: - Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production. Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. . **(20%)**

Unit-V: - Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage. Seed marketing: structure and organization, sales generation activities. Factors affecting seed marketing, Private and public sectors and their production and marketing strategies. . **(20%)**

Practical

1. Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra.
2. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, , pea.
3. Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard.
4. Seed production in important vegetable crops.
5. Seed sampling and testing: Physical purity, germination, viability, etc.
6. Seed and seedling vigour test.
7. Genetic purity test: Grow out test and electrophoresis.
8. Seed certification: Procedure, Field inspection, Preparation of field inspection report.
9. Visit to seed production farms, seed testing laboratories and seed processing plant.

Reference- Seed Science and Technology – P. S. Shukla

Farming System and Sustainable Agriculture 1(1+0)

Theory

- Unit-I:-** Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, . (20%)
- Unit-II: -** Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system. . (20%)
- Unit-III:-** Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, . (20%)
- Unit-IV: -** Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones. . (20%)
- Unit-V: -** Resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, . (20%)

Agricultural Marketing, Trade and Prices 3(2+1)

Theory

- Unit-I:-** Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities, . (20%)
- Unit-II: -** Product life cycle (PLC) and competitive strategies: Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; . (20%)
- Unit-III:-** Marketing process and functions: Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (AG-mark); Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel, number of channel levels; marketing channels for different farm products; Integration, efficiency, . (20%)
- Unit-IV:-** Costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India; Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading; . (20%)

Unit-V: - Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR. . (20%)

Practical

1. Plotting and study of demand and supply curves.
2. Study of relationship between market arrivals and prices of some selected commodities
3. Computation of marketable and marketed surplus of important commodities
4. Study of price behaviour over time for some selected commodities
5. Visit to market institutions – NAFED, cooperative marketing society. study their organization and functioning.

Reference-

Agriculture Economics – Harsharan Das

Introductory Agro-meteorology & Climate Change 2(1+1)

Theory

Unit-I:- Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze; . **(20%)**

Unit-II:- Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth; . **(20%)**

Unit-III:- Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification; Artificial rainmaking. Monsoon- mechanism and importance in Indian agriculture, . **(20%)**

Unit-IV: - Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Modifications of crop microclimate, climatic normals for crop and livestock production. . **(20%)**

Unit-V: - Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.. **(20%)**

Practical-

1. Visit of Agro-meteorological Observatory, site selection of observatory, exposure of instruments and weather data recording.
2. Measurement of total, shortwave and long wave radiation, and its estimation using Planck's intensity law.
3. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS.
4. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis.
5. Measurement of soil temperature and computation of soil heat flux.
6. Determination of vapor pressure and relative humidity.
7. Determination of dew point temperature.

**DEPARTMENT OF AGRICULTURE
SRK UNIVERSITY, BHOPAL (M.P)
PROGRAMME STRUCTURE
ACADMIC SESSION: 2018-19**

**B.Sc. Hons Agriculture Fourth Semester
Subject Wise Distribution**

Semester -IV

S.N.	Course Code	Credit of the course	Name of the course	Internal Assessment		Assignment		End Semester exams		Practical exams		Total marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	AG-401	2(1+1)	Crop Production Technology-II (Rabi crops)	30	15	-	-	50	25	20	10	100
2	AG-402	2(1+1)	Production Technology of Ornamental Crops, MAPs and Landscaping	30	15	-	-	50	25	20	10	100
3	AG-403	2(1+1)	Renewable Energy and Green Technology	30	15	-	-	50	25	20	10	100
4	AG-404	2(2+0)	Problematic Soils and their Management (New)	40	20	10	5	50	25	-	-	100
5	AG-405	2(1+1)	Production Technology for Fruit and Plantation Crops	30	15	-	-	50	25	20	10	100
6	AG-406	3(2+1)	Principles of Seed Technology	30	15	-	-	50	25	20	10	100
7	AG-407	1(1+0)	Farming System and Sustainable Agriculture	40	20	10	-	50	25	-	-	100
8	AG-408	3(2+1)	Agricultural Marketing, Trade and Prices	30	15	-	-	50	25	20	10	100
9	AG-409	2(1+1)	Introductory Agrometeorology & Climate Change	30	15	-	5	50	25	20	10	100
			Minimum Marks	-	145	-	10	-	225	-	70	450
Total		19 (12+7)	Maximum Marks	290	-	20		450	-	140	-	900

DEPARTMENT OF AGRICULTURE
SRK UNIVERSITY, BHOPAL
B. Sc. Agriculture
List of Subjects

V Semester			
S.NO.	SUB. CODE	SUBJECT TITLE	CREDIT
1	AG-501	Pests of Crops and Stored Grains and their Management	3(2+1)
2	AG-502	Manures, Fertilizers and Soil Fertility Management	3(2+1)
3	AG-503	Principles of Integrated Pest and Disease Management	3(2+1)
4	AG-504	Diseases of Field & Horticultural Crops & their Management-I	3(2+1)
5	AG-505	Crop Improvement – I (<i>Kharif</i>)	2(1+1)
6	AG-505	Entrepreneurship Development and Business Communication	2 (1+1)
7	AG-506	Geoinformatics, Nano-technology and Precision Farming	2(1+1)
8	AG-507	Practical Crop Production-I (<i>Kharif Crops</i>)	2(0+2)
9	AG-508	Intellectual Property Rights	1(1+0)
10	AG-509	Elective Course	3Credit
		Total Credit	24(12+09)+3

Department of Agriculture, SRK University, Bhopal

B.Sc. (Ag.) Vth SEMESTER Syllabus

Principles of Integrated Pest and Disease Management 3(2+1)

Theory

Unit- I: - Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests, diseases and pest risk analysis. **(25%)**

Unit- II: - Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level. **(15%)**

Unit- II: - Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management. **(20%)**

Unit- IV: - Survey surveillance and forecasting of Insect pest and diseases. Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease. **(20%)**

Unit- V: - Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes. Case histories of important IPM programmes. **(20%)**

Practical

1. Methods of diagnosis and detection of various insect pests, and plant diseases,
2. Methods of insect pests and plant disease measurement,
3. Assessment of crop yield losses, calculations based on economics of IPM
4. Identification of biocontrol agents, different predators and natural enemies.
5. Mass multiplication of *Trichoderma*, *Pseudomonas*, *Trichogramma*, NPV etc.
6. Identification and nature of damage of important insect pests and diseases and their management.
7. Crop (agroecosystem) dynamics of a selected insect pest and diseases.
8. Plan & assess preventive strategies (IPM module) and decision making.
9. Crop monitoring attacked by insect, pest and diseases.

Manures, Fertilizers and Soil Fertility Management 3(2+1)

Theory

Unit-I: - Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management. **(20%)**

Unit-II:- Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nano-fertilizers, Soil amendments, Fertilizer Storage, Fertilizer Control Order. **(20%)**

Unit-III: - History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. **(20%)**

Unit-IV: - Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. **(25%)**

Unit-V: - Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions. **(15%)**

Practical

1. Introduction of analytical instruments and their principles, calibration and applications,
2. Colorimetry and flame photometry.
3. Estimation of soil organic carbon,
4. Estimation of alkaline hydrolysable N in soils.
5. Estimation of soil extractable P in soils.
6. Estimation of exchangeable K; Ca and Mg in soils .
7. Estimation of soil extractable S in soils..
8. Estimation of DTPA extractable Zn in soils.
9. Estimation of N in plants.
10. Estimation of P in plants. Estimation of K in plants.
11. Estimation of S in plants.

Pests of Crops and Stored Grains and their Management 3(2+1)

Theory

Unit-I: - General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage, (25%)

Unit-II:- Management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crop, (25%)

Unit-III: - Vegetable crop, fruit crop, plantation crops, ornamental crops, spices and condiments. Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain. (30%)

Unit-IV: - Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. (25%)

Unit-V: - Storage structure and methods of grain storage and fundamental principles of grain store management. (25%)

Practical

1. Identification of different types of damage.
2. Determination of insect infestation by different methods.
3. Assessment of losses due to insects.
4. Calculations on the doses of insecticides application technique.
5. Fumigation of grain store / godown. Identification of rodents and rodent control operations in godowns.
6. Identification of birds and bird control operations in godowns.
7. Determination of moisture content of grain. Methods of grain sampling under storage condition.

Diseases of Field & Horticultural Crops & their Management-I 3(2+1)

Theory

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

Field crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; Maize: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose, (20%)

Unit-II: - Bajra :downy mildew and ergot; Groundnut: early and late leaf spots, wilt Soybean:

Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; Pigeonpea: Phytophthora blight, wilt and sterility mosaic; (20%)

Unit-III: - Finger millet: Blast and leaf spot; black & green gram: Cercospora leaf spot and

anthracnose, web blight and yellow mosaic; Castor: Phytophthora blight;Tobacco: black shank, black root rot and mosaic. (20%)

Unit-IV: - Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt,

Sigatoka and bunchy top;Papaya: foot rot, leaf curl and mosaic, Pomegranate: bacterial blight; Cruciferous vegetables: Alternaria leaf spot and black rot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; (20%)

Unit-V: - Tomato: damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic;

Okra: Yellow Vein Mosaic; Beans: anthracnose and bacterial blight; Ginger: soft rot; Colocasia: Phytophthora blight; Coconut: wilt and bud rot; Tea: blister blight; Coffee: rust (20%)

Practical

1. Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory.
 2. Field visit for the diagnosis of field problems.
 3. Collection and preservation of plant diseased specimens for Herbarium;
- Note: Students should submit 50 pressed and well mounted specimens.

Crop Improvement – I (*Kharif*) 2(1+1)

Theory

Unit-I:- Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops; **(25%)**

Unit-II: - Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops; **(25%)**

Unit-III: - Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic **(25%)**

Unit-IV: - Stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. **(15%)**

Unit-V: - Ideotype concept and climate resilient crop varieties for future. **(10%)**

Practical

1. Floral biology, emasculation and hybridization techniques in different crop species; viz., Rice, Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Sesame, Caster, Cotton, Floral biology, emasculation and hybridization techniques in different crop species Cowpea, Tobacco, Brinjal, Okra .
2. Maintenance breeding of different *kharif* crops.
3. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods;
4. Study of field techniques for seed production and hybrid seeds production in *Kharif* crops;
5. Estimation of heterosis, inbreeding depression and heritability;
6. Layout of field experiments;
7. Study of quality characters, donor parents for different characters;
8. Visit to seed production plots; Visit to AICRP plots of different field crops.

Entrepreneurship Development and Business Communication 2 (1+1)

Theory

Unit-I: - Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development, **(25%)**

Unit-II:- Impact of economic reforms on Agribusiness/ Agrienterprises, Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), **(25%)**

Unit-III: - Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill, **(20%)**

Unit-IV: - Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, **(20%)**

Unit-V: - Opportunities for agri-entrepreneurship and rural enterprise. **(10%)**

Practical

1. Assessing entrepreneurial traits, problem solving skills,
2. To study about Managerial skills and achievement motivation,
3. time audit through planning, monitoring and supervision,
4. identification and selection of business idea,
5. preparation of business plan and proposal writing,
6. visit to entrepreneurship development institute and entrepreneurs.

Geo-informatics, Nano-Technology and Precision Farming 2(1+1)

Theory

Unit-I: - Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture. (25%)

Unit-II:-Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; (10%)

Unit-III:-Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; (25%)

Unit-IV:- Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture; Nanotechnology, definition, concepts and techniques, (20%)

Unit-V:- Introduction about nanoscale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity. (20%)

Practical

1. Introduction to GIS software, spatial data creation and editing. Introduction to image processing software.
2. Visual and digital interpretation of remote sensing images.
3. Generation of spectral profiles of different objects.
4. Supervised and unsupervised classification and acreage estimation.
5. Multispectral remote sensing for soil mapping.
6. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones.
7. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology.
8. Use of GPS for agricultural survey.
9. Formulation, characterization and applications of nanoparticles in agriculture.
10. Projects formulation and execution related to precision farming.

Practical Crop Production-I (*Kharif Crops*) 2(0+2)

Practical

Unit-I:- Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management **(25%)**

Unit-II:-Management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. **(25%)**

Unit-III:-The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, **(20%)**

Unit-IV:-Insect-pest and disease management technologies. **(10%)**

Unit-V:-Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students. **(20%)**

Intellectual Property Rights 1(1+0)

Theory

Unit-I: - Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc. **(15%)**

Unit-II: - Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets. Patents Act 1970 **(20%)**

Unit-III: - Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, compulsory licensing, Patent Cooperation Treaty, Patent search and patent database. **(20%)**

Unit-IV: - Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders. **(25%)**

Unit-V: - Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing. **(20%)**

ELECTIVE COURSES

Agri-business Management 3 (2+1)

Theory

Unit-I Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries. Institutional arrangement, procedures to set up agro based industries. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages.

Unit-II Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture. Planning, meaning, definition, types of plans. Purpose or mission, goals Strategies, policies procedures, rules, programs and budget. Components of a business plan, Steps in planning and implementation.

Unit-III Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance. Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Consumer behaviour analysis, Product Life Cycle (PLC). Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation techniques.

Practical

Study of agri-input markets: Seed, fertilizers, pesticides. Study of output markets: grains, fruits, vegetables, flowers. Study of product markets, retail trade commodity trading, and value added products. Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD. Preparations of projects and Feasibility reports for agribusiness entrepreneur. Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques. Case study of agro-based industries. Trend and growth rate of prices of agricultural commodities. Net present worth technique for selection of viable project. Internal rate of return.

DEPARTMENT OF AGRICULTURE
SRK UNIVERSITY, BHOPAL (M.P)
PROGRAMME STRUCTURE
ACADMIC SESSION: 2018-19

B.Sc. Agriculture Fifth Semester
Subject Wise Distribution of marks and corresponding Credit

Semester -V

S.N	Course code	Credit of the course	Name of the course	Internal Assessment		Assignment		End Semester exams		Practical exams		Total Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	AG-501	3(2+1)	Pests of Crops and Stored Grains and their Management	30	15	-	-	50	25	20	10	100
2	AG-502	3(2+1)	Manures, Fertilizers and Soil Fertility Management	30	15	-	-	50	25	20	10	100
3	AG-503	3(2+1)	Principles of Integrated Pest and Disease Management	30	15	-	-	50	25	20	10	100
4	AG-504	3(2+1)	Diseases of Field & Horticultural Crops & their Management-I	30	15	-	-	50	25	20	10	100
5	AG-505	2(1+1)	Crop Improvement – I (<i>Kharif</i>)	30	15	-	-	50	25	20	10	100
6	AG-505	2 (1+1)	Entrepreneurship Development and Business Communication	30	15	-	-	50	25	20	10	100
7	AG-506	2(1+1)	Geoinformatics, Nano-technology and Precision Farming	30	15	-	-	50	25	20	10	100
8	AG-507	2(0+2)	Practical Crop Production-I (<i>Kharif Crops</i>)	-	-	-	-	-	-	100	50	100
9	AG-508	1(1+0)	Intellectual Property Rights	40	25	10	5	50	25	-	-	100
10	AG-509	3(2+1)	Elective Course (Agri-business management)	30	15	-	-	50	25	20	10	100
			Minimum Marks	-	140	-	5	-	225	-	130	50
	Total	24(14+10)	Maximum Marks	280	-	10		450	-	260	-	1000