Faculty of Agriculture

Bhagwant University, Ajmer (Raj.)

B.Sc. AGRICULTURE COURSE PROGRAMS

INDEX

BHAGWANT UNIVERSITY

Established by Govt. of Raj. & Recognised by UGC

Sikar Road, Ajmer

RAJASTHAN

Syllabus

B.Sc. (Agriculture)

SEMESTER WISE DISTRIBUTION OF COURSES

I Semester

S.No	BU COURSE CODE	Course code no	COURSE TITLE	Cr.Hrs
1	01 AGB 101	HORT-111	FUNDAMENTALS OF HORTICULTURE	2(1+1)
2	01 AGB 102	BIOCHEM-111	FUNDAMENTALS OF PLANT BIOCHEMISTRY & BIOTECHNOLOGY	3(2+1)
3	01 AGB 103	SSAC-111	FUNDAMENTALS OF SOIL SCIENCE	3(2+1)
4	01 AGB 104	HORT-112	INTRODUCTION TO FORESTRY	2(1+1)
5	01 AGB 105	ENG-111	COMPREHENSION & COMMUNICATION SKILLS IN ENGLISH	2(1+1)
6	01 AGB 106	AGRON-111	FUNDAMENTALS OF AGRONOMY	4(3+1)
7	01 AGB 107	BIO-111/ MATHS-111	INTRODUCTORY BIOLOGY*/ELEMENTARY MATHEMATICS*	2(1+1)/2(2+0)*
8	01 AGB 108	AGHR-111	AGRICULTURAL HERITAGE*	1(1+0)*
9	01 AGB 109	EXCOM-111	RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY	2(2+0)
10	01 AGB 110	HVE-111	HUMAN VALUES & ETHICS (non gradial)	1(1+0)**
11	01 AGB 111	NSS/NCC/PEYP	NSS/NCC/PHYSICAL EDUCATION & YOGA PRACTICES**	2(0+2)**
	TOTAL			18+04*/03*+03**

II semester

S.No	BU COURSE CODE	Course code no	COURSE TITLE	Cr.Hrs
1	02AGB 101	GPB-121	FUNDAMENTALS OF GENETICS	3(2+1)
2	02AGB 102	SSAC-121	AGRICULTURAL MICROBIOLOGY	2(1+1)
3	02AGB 103	AGENGG-121	INTRODUCTORY SOIL AND WATER CONSERVATION ENGINEERING	2(1+1)
4	02AGB 104	CPHYS-121	FUNDAMENTALS OF CROP PHYSIOLOGY	2(1+1)
5	02AGB 105	AGECON-121	FUNDAMENTALS OF AGRICULTURAL ECONOMICS	2(2+0)
6	02AGB 106	PPATH-121	FUNDAMENTALS OF PLANT PATHOLOGY	3(2+1)
7	02AGB 107	ENTO-121	FUNDAMENTALS OF ENTOMOLOGY	3(2+1)
8	02AGB 108	EXCOM-121	FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION	3(2+1)
9	02AGB 109	CSPD-121	COMMUNICATON SKILLS & PERSONALITY DEVELOPMENT	2(1+1)
10	02AGB 110	NSS/NCC/PEYP	NSS/NCC/PHYSICAL EDUCATION & YOGA PRACTICES**	To be continued
	TOTAL			24(15+9)

III semester

S.No	BU COURSE CODE	Course code no	COURSE TITLE	Cr.Hrs
1	03AGB 101	AGRON-211	CROP PRODUCTION TECHNOLOGY – 1 (Kharif crops)	3(2+1)
2	03AGB 102	GPB-211	FUNDAMENTALS OF PLANT BREEDING	3(2+1)
3	03AGB 103	AGECON-211	AGRICULTURAL FINANCE & CO-OPERATION	3(2+1)
4	03AGB 104	AGRINFO-211	AGRI-INFORMATICS	2(1+1)
5	03AGB 105	AGENGG-211	FARM MACHINARY AND POWER	2(1+1)
6	03AGB 106	HORT-211	PRODUCTION TECHNOLOGY FOR VEGETABLE AND SPICES	2(1+1)
7	03AGB 107	ESDM-211	ENVIRONMENTAL SCIENCE & DISASTER MANAGEMENT	3(3+0)
8	03AGB 108	STAT-211	STATISTICAL METHODS	2(1+1)
9	03AGB 109	ANISC-211	LIVESTOCK & POULTRY MANAGEMENT	4(3+1)
10	03AGB 110	NSS	NSS	To be continued
	TOTAL			24(16+8)

IV SEMESTER

S.No	BU COURSE CODE	Course code no	COURSE TITLE	Cr.Hrs
1	04AGB101	AGRON-221	Crop production technology –ii *(rabi crops)*	2(1+1)
2	04AGB102	HORT-221	Production Technology for Ornamental Crops, MAP and Landscaping	2(1+1)
3	04AGB103	AGENGG-221	Renewable Energy and Green Technology	2(1+1)
4	04AGB104	SSAC-221	Problematic Soils and their Management	2(2+01)
5	04AGB105	HORT-221	Production Technology for Fruit and Plantation Crops	2(1+1)
6	04AGB106	GPB-221	Principles of Seed Technology	3(2+1)
7	04AGB107	AGRON-222	Farming system & sustainable agriculture	1(1+0)
8	04AGB108	AGECON-221	Agricultural marketing trade & prices	3(2+1)
9	04AGB109	AGRON-222	Introductory Agro-meteorology & Climate Change	2(1+1)
10	04AGB110	ENTO-222	Bio pesticides & biofertilizers(elective course)	3(2+1)
11	04AGB111	NSS	Nss**	To be continued
	TOTAL			23(13+10)

V Semester

S.No	BU COURSE CODE	Course Code No	COURSE TITLE	Cr.Hrs
1	05AGB 101	PPATH-311	Principles of integrated pest & disease managent	3(2+1)
2	05AGB 102	SSAC-311	Manures, Fertilizers and Soil Fertility Management	3(2+1)
3	05AGB 103	ENTO-311	Pests of Crops and Stored Grain and their Management	3(2+1)
4	05AGB 104	PPATH-312	Diseases of Field and Horticultural Crops and their Management -I	3(2+1)
5	05AGB 105	GPB-311	Crop improvement-i *(kharif crops)*	2(1+1)
6	05AGB 106	EDBC-311	Entrepreneurship Development and Business Communication	2(1+1)
7	05AGB 107	AGRON-311	Geoinformatics and Nano-technology and Precision Farming	2(1+1)
8	05AGB 108	AGRON-312	Practical Crop Production – I (*Kharif* crops)	2(0+1)
9	05AGB 109	GPB-312	Intellectual property rights	1(1+0)
10	05AGB 110	HORT-311	Landscaping (elective course)	3(2+1)
	TOTAL			21(12+09)+3

VI Semester

s.no	BU COURSE CODE	Course code no	COURSE TITLE	Cr.Hrs
1	06AGB 101	AGRON-321	Rainfed agriculture & watershed management	2(1+1)
2	06AGB 102	AGENGG-321	Protected Cultivation and Secondary Agriculture	2(1+1)
3	06AGB 103	PPATH-321	Diseases of Field and Horticultural Crops and their Management-II	3(2+1)
4	06AGB 104	HORT-321	Post-harvest Management and Value Addition of Fruits and Vegetables	2(1+1)
5	06AGB 105	ENTO-321	Management of Beneficial Insects	2(1+1)
6	06AGB 106	GPB-321	Crop Improvement-II *(Rabi crops)*	2(1+1)
7	06AGB 107	AGRON-322	Practical Crop Production –II (*Rabi* crops)	2(0+2)
8	06AGB 108	AGRON-323	Principles of Organic Farming	2(1+1)
9	06AGB 109	AGECON-321	Farm management, production & resource economics	2(1+1)
10	06AGB 110	HORT-322	Principles of Food Science and Nutrition	2(2+0)
11	06AGB 111	GPB-322	Micro-propagation technology (elective course)	3(2+1)
	TOTAL			21(11+10)+3

VII Semester

Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)			
S NO	**ACTIVITIES**	**NO .OF WEEKS**	**CREDIT HOURS**
1	General orientation & On campus training by different faculties	1	14
2	Village attachment	8	
	Unit attachment in Univ./ College. KVK/ Research Station Attachment	5	
3	Plant clinic	2	02
	Agro-Industrial Attachment	3	04
4	Project Report Preparation, Presentation and Evaluation	1	
Total weeks for RAWE & AIA		20	20

Agro- Industrial Attachment:

The students would be attached with the agro-industries for a period of 3 weeks to get an experience of the industrial environment and working**.**
Educational tour will be conducted in break between IV & V Semester or VI & VII Semester.

RAWE Component-I
Village Attachment Training Programme

S.No	Activity	Duration
1	Orientation and Survey of Village	1 week
2	Agronomical Interventions	1 week
3	Plant Protection Interventions	1 week
4	Soil Improvement Interventions (Soil sampling and testing)	1 week
5	Fruit and Vegetable production interventions	1 week
6	Food Processing and Storage interventions	1 week
7	Animal Production Interventions	1 week
8	Extension and Transfer of Technology activities	1 week

RAWE Component –II

Agro Industrial Attachment

Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 weeks.
Industries include Seed/Sapling production, Pesticides-insecticides, Post harvest-processing value addition, Agri-finance institutions, etc.

Activities and Tasks during Agro-Industrial Attachment Programme

1. Acquaintance with industry and staff
2. Study of structure, functioning, objective and mandates of the industry
3. Study of various processing units and hands-on trainings under supervision of industry staff
4. Ethics of industry
5. Employment generated by the industry
6. Contribution of the industry promoting environment
7. Learning business network including outlets of the industry
8. Skill development in all crucial tasks of the industry
9. Documentation of the activities and task performed by the students
10. Performance evaluation, appraisal and ranking of students

Modules for Skill Development and Entrepreneurship:

A student has to register 20 credits opting for two modules of (0+10) credits each (total 20 credits) from the package of modules in the **VIII semester.**

S .No	**BU COURSE CODE**	Parameters	CREDIT HOURS
1	08AGB 101	Production Technology for Bioagents and Biofertilizer	0+10
2	08AGB 102	Seed Production and Technology	0+10
3	08AGB 103	Mushroom Cultivation Technology	0+10
4	08AGB 104	Soil, Plant, Water and Seed Testing	0+10
5	08AGB 105	Commercial Beekeeping	0+10
6	08AGB 106	Poultry Production Technology	0+10
7	08AGB 107	Commercial Horticulture	0+10
8	08AGB 108	Floriculture and Landscaping	0+10
9	08AGB 109	Food Processing	0+10
10	08AGB 110	Agriculture Waste Management	0+10
11	08AGB 111	Organic Production Technology	0+10
12	08AGB 112	Commercial Sericulture	0+10

NOTE:

In addition to above ELP modules other important modules may be given to the students by SAUs.

Evaluation of Experiential Learning Programme/ HOT

S .No	Parameters	Max .Marks
1	Project Planning and Writing	10
2	Presentation	10
3	Regularity	10
4	Monthly Assessment	10
5	Output delivery	10
6	Technical Skill Development	10
7	Entrepreneurship Skills	10
8	Business networking skills	10
9	Report Writing Skills	10
10	Final Presentation	10
Total		**100**

Fundamentals of Horticulture (NEW) 2(1+1)

Objective :- This subject helps to study about the horticulture crops, plant propagation principles and methods of training and pruning methods & irrigation methods , fertilizer application in horticultural crops in this subject we can study about crops from raising to harvesting .

Theory :-

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops; Plant propagation-methods and propagating structures; Seed dormancy, Seed germination, principles of orchard establishment; Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy; medicinal and aromatic plants; importance of plant bio-regulators in horticulture. 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.

Outcome :-

Students will study about the following exercises which help them to develop practical knowledge by the following methods like preparing the potting mixture, training and pruning of fruit trees . These can be helpful through direct vision of nursery of orchard.

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

Objective :- This subject helps to study about the structure of monosaccharides importance of proteins and classification of lipids , fatty acids structures ,structure of nucleotide and different like glycolysis cycle and TCA cycle. It helps to study about concepts and applications of plant biotechnology , organ culture, callus culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods. ; PCR techniques and its applications; RFLP, SSR; Marker Assisted Breeding in crop improvement;

Theory:-

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 Poly saccharides. 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. 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. 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; 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; 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.

Outcome:-Students can learn knowledge about this subject by following practical excersies with lab experiments like Demonstration on isolation of DNA. Tissue culture media and preparation of stock solutions for MS nutrient medium.

Fundamentals of Soil Science 3(2+1)

Objective:-this subject helps to study about the soil formation,structure,colour, texture, and its physical properties and concepts of weathering and density of soil . benifical and harmful effects of macro and micro organisms.

Theory :-

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; 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; Soil air, composition, gaseous exchange, problem and plantgrowth, 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; soil colloids - inorganic and organic; silicate clays: constitution and properties; sources of charge; ion exchange, cation exchange capacity, base saturation; 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

Outcome :- Students will study about the soil profile and learn practical knowledge how to collect the soil samples and its processing and storage. By the experiments they learn about the determination of soil density and moisture content and porosity and as well as determination soil colour and study of the soil map.

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

Objective:-

This subject helps to study about the importance of agro forestry and selection of trees in agro forestry, different planting systems in agro forestry ,shifting cultivation ,alley cropping.

Theory

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; 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. 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. 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. 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.

Outcome :-

This subject helps to learn knowledge of identification of forestry tree species & their management and also practical knowledge by diameter measurement.

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

Objective:-

This study helps to gain knowledge English vocabulary, antonym ,synonym and it can improve spoken English this exercise helps the students in enrichment of vocabulary based on TOEFL and other competative examinations.

Theory

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. Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words. 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, Precise writing, Report writing and Proposal writing. The Style: Importance of professional writing. 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

Outcome:-

Through the English speaking and listening develop our skills and improving reading skills & communication skills.

Fundamentals of Agronomy 4(3+1)

Objective :-

This subject helps to study about the field crops which were included and students are learn about the crop nutrition ,soil-plant-water relationship .students can learn about different weeds & its importance & how to control the weeds and crop management technologies in problematic areas**.**

Theory

Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil-plant-water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, logging. Weeds- importance, classification, crop weed competition, concepts of weed managementprinciples and methods, herbicides- classification, selectivity and resistance, allelopathy. Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Practical

Identification of crops, seeds, fertilizers, pesticides and tillage implements, study of agroclimatic 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.

Outcome :-

This subject helps to know about more practical knowledge by cultivation of the crops from sowing to harvesting what ever techniques are involved in crop cultivation it improves the knowledge by the study of yield contributing characters and yield estimation , use of tillage implements , measurement of irrigation water.

Introductory Biology (New) 2(1+1)

Objective :- This subject helps to learn knowledge about plants introduction to living world , characteristics & diversity of life & their origin , morphology of flowering plants.

Theory

Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics. Binomial nomenclature and classification Cell and cell division. Morphology of flowing plants. Seed and seed germination. Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture.

Practical

Morphology of flowering plants – root, stem and leaf and their modifications. Inflorence, 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.

Outcome :-

This subject helps to know about how to identify inflorescence and internal structure of root stem and leaf with description of plants and then study of specimens & slides.

Elementary Mathematics (New) 2(2+0)

Objective :-

This subject helps to know about the distance formula ,equation of co-ordinate axes ,equation lines parallel to axes ,differentiation of inverse ,trigonometric functions .Maxima and minima of functions of the form y=f(x) (simple problems based on it).

Theory :-

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, 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, General equation of a circle, Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points (x1 , y1) & (x2 ,y2), 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 x2 + y2 = a2 . Differential Calculus : Definition of function, limit and continuity, Simple problems on limit, Simple problems on continuity, Differentiation of xn , ex , sin x & cos x from first principle, 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), 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.

Outcome :-

Students can gain knowledge about calculation of errors in time of thesis topics.

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

Objective :-

Agricultural heritage will helps to know about ancient agricultural practices : Relevance of heritage to present day agriculture and also t will helps to study about crop voyage in india and world from this subject we can learn about current scenario of Indian agriculture.

Theory

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

Outcome :-

This subject helps to know about scope of agriculture & importance of agriculture and agricultural resources available in india and study about Indian agricultural concerns and future prospects.

Rural Sociology & Educational Psychology 2(2+0)

Objective :-

Rural sociology is the main subject to know about the sociology and scope of ecology ,rural society ,social groups ,culture concept &social institutions .This subject helps to study about educational psychology meaning & its importance in agricultural extension.

Theory

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

Outcome:-

This subject helps to study about rural sociology & educational psychology and its cognitive ,affective , psychomotor domain ,personality ,learning , motivation ,and intelligence.

Human Value and Ethics 1(1+0)

Objective :-

This subject study about Goal and Mission of Life. Vision of Life. Principles and Philosophy and Self Awareness,Self Satisfaction. Decision Making ,Motivation,Sensitivity & . Attachment and Detachment. Spirituality Quotient. Examination.

Theory

Values and Ethics-An Introduction. Goal and Mission of Life. Vision of Life. Principles and Philosophy. Self Exploration. Self Awareness. Self Satisfaction. Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination.

Outcome :-

This subject helps to know about Principles and Philosophy ,Self Awareness , Decision Making,Motivation and examination.

National Service Scheme

Objective :-

From this subject students can learn about basic components of NSS: history, objectives, principles, symbol, badge regular programmes under NSS / schemes of GOI and coordination with different agencies and maintenance of diary ,Understanding youth Community mobilization ,Indian history and culture Citizenship, constitution and human rights, Basic features of constitution of India.

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 peacebuilding

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

Outcome:-

This subject helps to study about the and basic components of NSS: Orientation: history, objectives under NSS / schemes of GOI and coordination with different agencies and maintenance of diary ,Understanding youth Community mobilization ,Indian history, Basic features of constitution of India.

National Cadet Corps

Objective:-

It is an important subject to learn about , objectives, organization of NCC and NCC song, Saluting at the halt, getting on parade, Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizenand . Civil defense organization, types of emergencies, fire fighting, protection.

1. Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline.

2. Drill- aim, general words of command, attention, stands at ease, stand easy and turning.

3. Sizing, numbering, forming in three ranks, open and close order march and dressing

4. Saluting at the halt, getting on parade, dismissing and falling out.

5. Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear.

6. Turning on the march and wheeling. Saluting on the march.

7. Marking time, forward march and halt.

8. Changing step, formation of squad and squad drill.

9. Command and control, organization, badges of rank, honours and awards

10. Nation Building- cultural heritage, religions, traditions and customs of India. National integration.

11. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizen.

12. Leadership traits, types of leadership. Character/personality development.

13. Civil defense organization, types of emergencies, fire fighting, protection,

14. Maintenance of essential services, disaster management, aid during development projects.

15. Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning.

16. Structure and function of human body, diet and exercise, hygiene and sanitation.

17. Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health.

18. Adventure activities

19. Basic principles of ecology, environmental conservation, pollution and its control.

20. Precaution and general behaviour of girl cadets, prevention of untoward incidents, vulnerable parts of the body, self defense.

Outcome:-

students develop their knowledge by this subjects through participating different , safe blood donation, first aid, physical and mental health. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizen.

Physical Education and Yoga Practices

Objective:-It is and important subject to learn about different games like Teaching of advance skills of Football – involvement of all the skills in game situation with teaching of rules of the game. Teaching – Meaning, Scope and importance of Physical Education.

1. Teaching of skills of Football – demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit) 2. Teaching of different skills of Football – demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit)

3. Teaching of advance skills of Football – involvement of all the skills in game situation with teaching of rules of the game

4. Teaching of skills of Basketball – demonstration, practice of the skills, correction of skills, involvement in game situation

5. Teaching of skills of Basketball – demonstration, practice of the skills, involvement in game situation

6. Teaching of skills of Basketball – involvement of all the skills in game situation with teaching of rule of the game

7. Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation

8. Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation

9. Teaching of advance skills of Kabaddi – involvement of all the skills in game situation with teaching of rule of the game

10. Teaching of skills of Ball Badminton – demonstration, practice of the skills, correction of skills, involvement in game situation

11. Teaching of skills of Ball Badminton – involvement of all the skills in game situation with teaching of rule of the game

12. Teaching of some of Asanas – demonstration, practice, correction and practice

13. Teaching of some more of Asanas – demonstration, practice, correction and practice

14. Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation

15. Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation

16. Teaching of skills of Table Tennis – involvement of all the skills in game situation with teaching of rule of the game

17. Teaching – Meaning, Scope and importance of Physical Education

18. Teaching – Definition, Type of Tournaments

19. Teaching – Physical Fitness and Health Education

20. Construction and laying out of the track and field (*The girls will have Tennikoit and Throw Ball).

Outcome:- students can gain knowledge by involvement of all the skills in game situation with teaching of rule of the game. demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit).

II SEMESTER

Fundamentals of Genetics 3(2+1)

Objective:-

This subject helps to study about Mendelian principles of heredity, centromere, secondary constriction and telomere; special types of chromosomes. Chromosomal theory of inheritance-cell cycle and cell division- mitosis and meiosis, Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation.

Theory:-

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. Architecture of chromosome; chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere; special types of chromosomes. Chromosomal theory of inheritance-cell cycle and cell division- mitosis and meiosis.

Probability and Chi-square. Dominance relationships, Epistatic interactions with example. Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical variations in chromosome and their implications, Use of haploids, dihaploids and doubled haploids in Genetics. Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance. Genetic disorders. 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.

Outcome:-

This subject helps to study about Post Mendelian concepts of heredity Blood group genetics Mutation, classification mutagenic agents and induction of mutation Gene concept: Gene structure, function and regulation, Lac and Trp operons, Experiments on probability and Chi-square test and Study of models on DNA and RNA structures.

Agricultural Microbiology 2(1+1)

Objective :-

This subject helps to study about the Prokaryotic and eukaryotic microbes and Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and Sulphur cycles, and biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.

Theory

Introduction. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth. Bacterial genetics: Genetic recombinationtransformation, conjugation and transduction, plasmids, transposon. Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and Sulphur cycles. Biological nitrogen fixation- symbiotic, associative and asymbiotic. Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere. 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.

Outcome:-

This subject helps to study about microbiology laboratory and its equipments & Methods of sterilization Methods of isolation and purification of microbial cultures Isolation of Rhizobium from legume root nodule and Isolation of BGA.

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

Objective :-

This subject helps to learn about definition and agents of soil erosion, water erosion: Forms of water erosion. Gully classification and control measures and Principles of wind erosion control and its control measures.

Theory

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

loss estimation by universal Loss Soil Equation. Soil loss measurement techniques. Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing. Grassed water ways and their design. Water harvesting and its techniques. Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

Practical

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

Outcome :-

This subjects helps to gain knowledge about how to conserve the soil,principles of erosion control and wind control. In practical portion students can learn how to calculate erosion index and problems on wind erosion.

Fundamentals of Crop Physiology 2(1+1)

Objective:-This subjects helps to know about complete life process of plants and how the plants will uptake nutrients . Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.

Theory

Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology; Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; 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; Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.

Practical

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

Outcome :-

These subject helps to know about the Plant cell Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology and Light and Dark reactions, C3, C4 and CAM plants .Study of plant cells of photosynthetic pigments through paper chromatography, photosynthesis, respiration.

Fundamentals of Agricultural Economics 2(2+0)

Objective :-

This subject helps to know About economic analysis, micro and macro economics and characteristics of agriculture, importance and its role in economic development and Role in modern economy, types of banks, functions of commercial & central bank ,Agricultural and public finance.

Theory

Economics: Meaning, scope and subject matter, definitions, activities, approaches to economic analysis; micro and macro economics, positive and normative analysis. Nature of economic theory; rationality assumption, concept of equilibrium, economic laws as generalization of human behavior. Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. 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. 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. 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.

Outcome :-

This helps to know about characteristics of agriculture, importance and its role in economic development and Role in modern economy and types of banks & its role in agriculture.

Fundamentals of Plant Pathology 3(2+1)

Objective:-

Plant Pathology is the important subject to know about the Importance of plant diseases and history of plant pathology , different groups of fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites, Preparation of media, isolation and Koch's postulates and Study of fungicides and their formulations.

Theory

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.

Fungi: general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, sub-divisions, orders and classes.

Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction.

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. 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.

Outcome :-

This subject helps study about Collection and preservation of disease specimen and nematode extraction & Preparation of media. Study of fungicides and their formulations, Methods of pesticide application and their safe use.

Fundamentals of Entomology 4(3+1)

Objective :-

This subject helps to learn about Classification of phylum Arthropoda, Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus and Types of reproduction in insects and Concept of IPM, Practices, scope and limitations of IPM.

Part – 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.

Part-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.

Part III

Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical controlimportance, 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

Part – 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; Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, 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.

Outcome :-

This subject helps to know about the Effect of abiotic factors and Types of larvae and pupae, recent methods of pest control and types of reproduction and Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes.

Fundamentals of Agricultural Extension Education 3(2+1)

Objective :-

Agricultural Extension Education is the important subject to know about the principles of Extension Education and Principles and Steps in Programme Development, Rural Development, Functions of Communication, monitoring and evaluation of extension programmes.

Theory

Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planningMeaning, Process, Principles and Steps in Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.); various extension/ agriculture development programmes launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP, etc.). 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 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; communication: meaning and definition; Principles and Functions of Communication, models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.

Practical

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

and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

Objective :-

This subject helps to know about Principles and Functions of Communication, Agriculture journalism, and functions of DRDA Principles and Steps in Programme Development, Rural Development.

Communication Skills and Personality Development 2 (1+1)

Objective:-

This subjects helps to learn about functional grammar ,Communication Skills, oral presentation skills and individual and group presentations and verbal and nonverbal communication.

Theory

Communication Skills: Structural and functional grammar; meaning and process of communication, verbal and nonverbal communication; 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, impromptu presentation, public speaking; Group discussion. 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.

Outcome:-

This subjects helps to know about process of communication, verbal and nonverbal communication and individual and group presentations.

National Service Scheme II

Objective :-

This subject helps to know about good qualities of leadership , problem-solving and decision-making and scope of health education, Development of youth programmes and policy at the national level, state level.

Importance and role of youth leadership Meaning, types and traits of leadership, qualities of good leaders; importance and roles of youth leadership Life competencies Definition and

importance of life competencies, problem-solving and decision-making, inter personal communication Youth development programmes Development of youth programmes and policy at the national level, state level and voluntary sector; youth-focused and youth-led organizations

Health, hygiene and sanitation Definition needs and scope of health education; role of food, nutrition, safe drinking water, water born diseases and sanitation (Swachh Bharat Abhiyan) for health; national health programmes and reproductive health.

Youth health, lifestyle, HIV AIDS and first aid Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid Youth and yoga History, philosophy, concept, myths and misconceptions about yoga; yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method

Outcome:-

This subject helps to know about Youth health, lifestyle, types and traits of leadership and qualities of good leadership decision-making, inter personal communication and Youth development programmes.

National Cadet Corps

Objectives:-

1. Arms Drill- Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms.

2. Shoulder from the order and vice-versa, present from the order and vice-versa.

3. Saluting at the shoulder at the halt and on the march. Short/long trail from the order and viceversa. 4. Guard mounting, guard of honour, Platoon/Coy Drill.

5. Characteristics of rifle (.22/.303/SLR), ammunition, fire power, stripping, assembling, care, cleaning and sight setting.

6. Loading, cocking and unloading. The lying position and holding.

7. Trigger control and firing a shot. Range Procedure and safety precautions. Aiming and alteration of sight.

8. Theory of groups and snap shooting. Firing at moving targets. Miniature range firing.

9. Characteristics of Carbine and LMG.

10. Introduction to map, scales and conventional signs. Topographical forms and technical terms.

11. The grid system. Relief, contours and gradients. Cardinal points and finding north. Types of bearings and use of service protractor.

12. Prismatic compass and its use. Setting a map, finding north and own position. Map to ground and ground to map.

13. Knots and lashings, Camouflage and concealment, Explosives and IEDs.

14. Field defenses obstacles, mines and mine lying. Bridging, waterman ship

15. Field water supplies, tracks and their construction.

16. Nuclear, Chemical and Biological Warfare (NCBW)

17. Judging distance. Description of ground and indication of landmarks.

18. Recognition and description of target. Observation and concealment. Field signals. Section formations.

19. Fire control orders. Fire and movement. Movement with/without arms. Section battle drill.

20. Types of communication, media, latest trends and developments.

Outcome :-

Physical Education and Yoga Practices

1. Teaching of skills of Hockey – demonstration practice of the skills and correction.

2. Teaching of skills of Hockey – demonstration practice of the skills and correction. And involvement of skills in games situation

3. Teaching of advance skills of Hockey – demonstration practice of the skills and correction. Involvement of all the skills in games situation with teaching of rules of the game

4. Teaching of skills of Kho-Kho – demonstration practice of the skills and correction.

5. Teaching of skills of Kho-Kho – demonstration practice of the skills and correction. Involvement of the skills in games situation

6. Teaching of advance skills of Kho-Kho – demonstration practice of the skills and correction. Involvement of all the skills in games situation with teaching of rules of the game

7. Teaching of different track events – demonstration practice of the skills and correction.

8. Teaching of different track events – demonstration practice of the skills and correction.

9. Teaching of different track events – demonstration practice of the skills and correction with competition among them.

10. Teaching of different field events – demonstration practice of the skills and correction.

11. Teaching of different field events – demonstration practice of the skills and correction.

12. Teaching of different field events – demonstration practice of the skills and correction.

13. Teaching of different field events – demonstration practice of the skills and correction with competition among them.

14. Teaching of different asanas – demonstration practice and correction.

15. Teaching of different asanas – demonstration practice and correction.

16. Teaching of different asanas – demonstration practice and correction.

17. Teaching of different asanas – demonstration practice and correction.

18. Teaching of weight training – demonstration practice and correction.

19. Teaching of circuit training – demonstration practice and correction.

20. Teaching of calisthenics – demonstration practice and correction. Note: 1) Compulsory Uniform: Half pants, Tee Shirts, Shoes and socks all white (Girls will have white Tee Shirt and Track pants) 2) The games mentioned in the practical may be inter changed depending on the season and facilities.

III SEMESTER

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

Objective:-This subjects helps to students how to cultivate crops and how to manage crops, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce.

Practical

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

Outcome:-This subjects is very useful for students in practically they can work over in field so they learn knowledge about crop management operations like: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management

Fundamentals of Genetics 3(2+1)

Objective:-Genetics can improve knowledge about .Chromosomal theory of inheritance- cell cycle and cell division- mitosis and meiosis. Probability and Chi-square and Structural and numerical variations in chromosome and their implications, Use of haploids, dihaploids and doubled haploids in Genetics.

Theory

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. Architecture of chromosome; chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere; special types of chromosomes. Chromosomal theory of inheritance-cell cycle and cell division- mitosis and meiosis. Probability and Chi-square. Dominance relationships, Epistatic interactions with example. Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical variations in chromosome and their implications, Use of haploids, dihaploids and doubled haploids in Genetics. Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance. Genetic disorders. 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.

Outcome:-Genetics is very important to students by practically. 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.

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

Objective:-

This subjects is very useful to students in agriculture how the loans provide by the banks to farmers An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank, Insurance and Credit Guarantee Corporation of India.

Theory

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. Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC. 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. 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. 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.

Practicals

Determination of most profitable level of capital use. Optimum allocation of limited amount of capital among different enterprise. Analysis of progress and performance of cooperatives using published data. Analysis of progress and performance of commercial banks and RRBs using

published data. Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management, schemes and procedures. Estimation of credit requirement of farm business – A case study. Preparation and analysis of balance sheet – A case study. Preparation and analysis of income statement – A case study. Appraisal of a loan proposal A case study. Techno-economic parameters for preparation of projects. Preparation of Bankable projects for various agricultural products and its value added products. Seminar on selected topics.

Outcome:-This subjets can improve knowledge by Estimation of credit requirement of farm business – A case study Preparation and analysis of balance sheet , Preparation of Bankable projects for various agricultural products and its value added products. Seminar on selected topics.

Agriinformatics2(1+1)

Objective:-This subjects improve computer knowledge in Agriculture like, Use of ICT in Agriculture Introduction to computer programming languages, concepts and standard input/output operations. e-Agriculture, . 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.

Theory :-

Introduction to Computers, Operating Systems, definition and types, Applications of MSOffice for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations. 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, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology for generating valuable agri-information. 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.

Practical :-

Study of Computer Components, accessories, practice of important DOS Commands. Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. MS-ACCESS: Creating

Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW). Introduction of programming languages. Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools. Introduction of Geospatial Technology for generating valuable information for Agriculture. Hands on Decision Support System. Preparation of contingent crop planning

Outcome:-students can gain knowledge by this subject with some portion like; Computation of water and nutrient requirements of crop using CSM and IT tools and Introduction of Geospatial Technology for generating valuable information for Agriculture. Hands on Decision Support System. Preparation of contingent crop planning. . Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management.

Farm Machinery and Power 2(1+1)

Objective:-This subject is very helpful to students to learn about agriculture implements and study about , I.C. engines, working principles of I C engines, comparison of two stroke and four stroke cycle engines,Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations.

Theory

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 , 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, 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, 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, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Practicals

Study of different components of I.C. engine. To study air cleaning and cooling system of engine, Familiarization with clutch, transmission, differential and final drive of a tractor, Familiarization with lubrication and fuel supply system of engine, Familiarization with brake, steering, hydraulic control system of engine, Learning of tractor driving, Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow . Familiarization with seedcum-fertilizer drills their seed metering mechanism and calibration,

planters and transplanter Familiarization with different types of sprayers and dusters Familiarization with different intercultivation equipment, Familiarization with harvesting and threshing machinery

Outcome:-This subject can is very useful to students how tractors wew work over in agriculture and implements used in agriculture.it can improve knowledge by study of air cleaning and cooling system of engine.

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

Objective:-This subjects involves cultivation of fruits and and plantation crops by this subjects students can learn importance of fruits and production technologies for the cultivation of fruits l and plantation crops.

Theory

Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks; Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, sapota, apple, pear, peach, walnut, almond and; minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberry, plantation crops-coconut, arecanut, cashew, tea, coffee & rubber.

Practical

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

Outcome:-By this subjects students can learn what are the importance and techniques were used in fruits and plantation crops for cultivation and what is meant by orchand and its importance.

Environmental Studies and Disaster Management 3 (2+1)

Objective :-

This subject helps to know about ecosystem, Value of biodiversity & threats of bio diversity, In-situ and Ex-situ conservation of biodiversity and hot spots of bio diversity, environmental pollution.

Theory

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) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles. 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)

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-sports 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.

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.

Social Issues and the Environment: From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value

Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.

Outcome:-

This subject helps to know about In-situ and Ex-situ conservation of biodiversity and rain water harvesting, Environmental Pollution.

Disaster Management :-

Objective :-

This subject helps to know about the natural disasters, their types and effects, Man Made Disasters and Disaster Management & concepts of disaster management and role of NGO.

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.

Practical

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

Outcome:-

This subject helps to know about Pollution case studies, Disaster Management & concepts of disaster management.

Statistical Methods 2(1+1)

Objective:-

This subject helps to study about Graphical Representation of Data , Addition and Multiplication AND , Chi-Square Test, Introduction to Sampling Methods Use of Random Number Tables for selection of Simple Random Sample.

Theory

Introduction to Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency & Dispersion, Definition of Probability, Addition and Multiplication Theorem (without proof). Simple Problems Based on Probability. Binomial & Poisson Distributions, Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations. 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. 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.

Practical

Graphical Representation of Data. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Dispersion (Ungrouped Data).

Measures of Dispersion (Grouped Data). Moments, Measures of Skewness & Kurtosis (Ungrouped Data). Moments, Measures of Skewness & Kurtosis (Grouped Data). Correlation & Regression Analysis. Application of One Sample t-test. Application of Two Sample Fisher's t-test. Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for 2 ×2 contingency table. Analysis of Variance One Way Classification. Analysis of Variance Two Way Classification. Selection of random sample using Simple Random Sampling.

Outcome :-

This subject helps to know about the Graphical Representation of Data and Application of One Sample t-test Application of Two Sample Fisher's t-test, Analysis of Variance Two Way Classification and Selection of random sample using Simple Random Sampling.

Livestock & Poultry Management 4 (3+1)

Objective:-

This subject helps to learn about the Role of livestock in the national economy, Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry and Feeding of livestock and poultry Planning and layout of housing for different types of livestock.

Theory

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation,

hatching and brooding. Management of growers and layers. 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. 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. Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

Practical

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

Outcome:-

This subject helps know about the Judging of cattle, buffalo and poultry , Culling of livestock and poultryExternal body parts of cattle, buffalo, sheep, goat, swine and poultry .

National Service Scheme III

Objective :-

This subject helps to know about Vocational skill development, Disaster management, Entrepreneurship development and Documentation and data reporting .

Vocational skill development

To enhance the employment potential and to set up small business enterprises skills of volunteers, a list of 12 to 15 vocational skills will be drawn up based on the local conditions and opportunities. Each volunteer will have the option to select two skill-areas out of this list

Issues related environment

Environmental conservation, enrichment and sustainability, climatic change, natural resource management (rain water harvesting, energy conservation, forestation, waste land development and soil conservations) and waste management

Disaster management

Introduction and classification of disaster, rehabilitation and management after disaster; role of NSS volunteers in disaster management.

Entrepreneurship development

Definition, meaning and quality of entrepreneur; steps in opening of an enterprise and role of financial and support service institution.

Formulation of production oriented project

Planning, implementation, management and impact assessment of project

Documentation and data reporting

Collection and analysis of data, documentation and dissemination of project reports.

Outcome:-

This subjects helps to study about the Disaster management waste land development and soil and waste management.

IV SEMESTER

Crop Production Technology-II (Rabi crops) 3(2+1)

Objective:-

This subject helps to study about the cereals , pulses , oilseeds ,sugar crops, medicinal and aromatic crops , Sowing methods of wheat and sugarcane and study of yield contributing characters of rabi season crops and oil extraction methods .

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; cereals –wheat and barley, pulses-chickpea, lentil, peas, oilseeds-rapeseed, mustard and sunflower; sugar crops-sugarcane; medicinal and aromatic crops-mentha, lemon grass and citronella, Forage crops-berseem, lucerne and oat.

Practical

Sowing methods of wheat and sugarcane, identification of weeds in rabi season crops, study of morphological characteristics of rabi crops, study of yield contributing characters of rabi season crops, yield and juice quality analysis of sugarcane, study of important agronomic experiments of rabi crops at experimental farms. Study of rabi forage experiments, oil extraction of medicinal crops, visit to research stations of related crops.

Outcome :-

This subject helps to know about cultivation practices of , pulses , oilseeds ,sugar crops, medicinal and aromatic & identification of weeds in rabi season crops and Study of rabi forage experiments, oil extraction of medicinal crops.

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

Objective:-

This subject helps to learn about the Importance and scope of ornamental crops, medicinal and aromatic plants and . Production technology of important cut flowers . Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions

Theory

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers. Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions. 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. Processing and value addition in ornamental crops and MAPs produce.

Practical

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures – care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

Outcome :-

From this subject students will learn about Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants.and they will know about Harvesting and post harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

Renewable Energy and Green Technology 2(1+1)

Objective :-

This is the basic subject to know about Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy.

Theory

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater,

application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application.

Practical

Familiarization with renewable energy gadgets. To study biogas plants, To study gasifier, To study the production process of biodiesel, To study briquetting machine, To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light, solar pumping, solar fencing. To study solar cooker, To study solar drying system. To study solar distillation and solar pond

Outcome :-

From this subject students will learn about Familiarization with renewable energy gadgets. To study biogas plants, To study gasifier, To study the production process of biodiesel, To study briquetting machine, To study the production process of bio-fuels.

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

Objective :-

This subject is helps to study about Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils. Irrigation water – quality and standards, utilization of saline water in agriculture.

Theory

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils. Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils. Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems.

Outcome :-

From this subject stdents will learn about Remote sensing and GIS in diagnosis and management of problem soils. Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems.

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

Objective :-

This is the major subject in horticulture to know about Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks; Production technologies for the cultivation of major fruits.

Theory

Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks; Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, sapota, apple, pear, peach, walnut, almond and; minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberry, plantation crops-coconut, arecanut, cashew, tea, coffee & rubber.

Practical

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

Outcome :-

This subject is helps to study about Seed propagation. Scarification and stratification of seeds. Propagation methods for fruit and plantation crops. Description and identification of fruit.and students can also learn about Preparation of plant bio regulators and their uses, Important pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchards.

Principles of Seed Technology 3(1+2)

Objective :-

Principles of seed technology is the major subject to know about 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; Definition, Characters of good quality seed, different classes of seed.

Theory

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; 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. 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. 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. 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, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and their production and marketing strategies.

Practical

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

Outcome :-

From this subject students will know about Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea. Seed production in major oilseeds.and students practically learn about Physical purity, germination, viability, etc. Seed and seedling vigour test. Genetic purity test: Grow out test and electrophoresis. Seed certification

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

Objective :-

this is the major subject to know about 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. And they will know about cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits

Theory

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; 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; 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 (Agmark); 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, 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; 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.

Practical

Plotting and study of demand and supply curves and calculation of elasticities; Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities; Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies, identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class; Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning; Application of principles of comparative advantage of international trade.

utcome :-

From this subject students will know about Plotting and study of demand and supply curves and calculation of elasticities; Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities

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

Objective :-

This is the important subject in agronomy to know about 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; Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo.and they will know about - 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.

Theory

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; 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; 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, 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. 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.

Practical

Visit of Agrometeorological Observatory, site selection of observatory, exposure of instruments and weather data recording. Measurement of total, shortwave and longwave radiation, and its

estimation using Planck's intensity law. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity. Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions. Measurement of wind speed and wind direction, preparation of wind rose. Measurement, tabulation and analysis of rain. Measurement of open pan evaporation and evapotranspiration. Computation of PET and AET.

Outcome :-

From this subject students will practically learn about Visit of Agrometeorological Observatory, site selection of observatory, exposure of instruments and weather data recording. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS. Measurement of maximum and minimum air temperatures.

Biopesticides & Biofertilizers 3(2+1)

Objective :-

Biopesticides&bio fertilizers are the most important in agriculture .from this subject students will learn about History and concept of biopesticides. Importance, scope and potential of biopesticide.Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and Biorationales.and they will know about - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- *Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium* and *Frankia*; Cynobacterial biofertilizers- *Anabaena, Nostoc*, Hapalosiphon and fungal biofertilizers- AM mycorrhiza and ectomycorhiza

Theory

History and concept of biopesticides. Importance, scope and potential of biopesticide.Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationales. Botanicals and their uses. Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide. Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- *Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium* and *Frankia*; Cynobacterial biofertilizers- *Anabaena, Nostoc*, Hapalosiphon and fungal biofertilizers- AM mycorrhiza and ectomycorhiza. Nitrogen fixation -Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization. Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertiizers. FCO specifications and quality control of biofertilizers. Application

technology for seeds, seedlings, tubers, sets etc. Biofertilizers -Storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers.

Practical

Isolation and purification of important biopesticides: *Trichoderma Pseudomonas, Bacillus, Metarhyzium* etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition. Quality control of biopesticides. Isolation and purification of *Azospirillum , Azotobacter, Rhizobium*, P-solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of AM fungi -Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

Outcome :-

From this subject students will know about Isolation and purification of important biopesticides: *Trichoderma Pseudomonas, Bacillus,Metarhyzium* etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition.

National Service Scheme IV

Objective :-

This is the major subject which is related to Sociological and psychological factors influencing youth crime, cyber crime, pear mentoring in preventing crime and awareness for juvenile justice

Youth and crime

Sociological and psychological factors influencing youth crime, cyber crime, pear mentoring in preventing crime and awareness for juvenile justice

Civil/self defence

Civil defence services, aims and objectives of civil defence; needs and training of self defence

Resource mobilisation

Writing a project proposal of self fund units (SFUs) and its establishment

Additional life skills

Positive thinking, self confidence and esteem, setting life goals and working to achieve them, management of stress including time management.

Outcome :-

From this subject students will learn about Positive thinking, self confidence and esteem, setting life goals and working to achieve them,
management of stress including time management.

V SEMESTER

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

Objective:-This subject can help to students to know about pest and damage, how to control pest and what are the methods were useful to prevent insect pest &disease.students can learn different types of symptoms were take place in plant parts.they can know about what is IPM and their use.

Theory

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. Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level. 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. 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. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes. Case histories of important IPM programmes.

Practical

Methods of diagnosis and detection of various insect pests, and plant diseases, Methods of insect pests and plant disease measurement, Assessment of crop yield losses, calculations based on economics of IPM,Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of *Trichoderma, Pseudomona*s, *Trichogramma*, NPV etc. Identification and nature of damage of important insect pests and diseases and their management. Crop (agroecosystem) dynamics of a selected insect pest and diseases. Plan & assess preventive strategies (IPM module) and decision making. crop monitoring attacked by insect, pest and diseases . Awareness campaign at farmers fields.

Outcome:-This subjects helps to identify what kind of pests and their symptoms developed on leaves.They know how to control pests and what are the herbicides used for different crops

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

Objective:-This subject helps to know about manures which is useful to the soil and how fertilizers place in soil with their composition.by this students know chemical fertilizers is harmful to the soil and loss its fertility.so it encourage to use organic fertilizers to improve soil fertility.

Theory

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. 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.
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. 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. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

Practical

Introduction of analytical instruments and their principles, calibration and applications, Colorimetry and flame photometry. Estimation of soil organic carbon, Estimation of alkaline hydrolysable N in soils. Estimation of soil extractable P in soils. Estimation of exchangeable K; Ca and Mg in soils . Estimation of soil extractable S in soils.. Estimation of DTPA extractable Zn in soils. Estimation of N in plants. Estimation of P in plants. Estimation of K in plants. Estimation of S in plants.

Outcome:-This subjects can helps how the soil testing should dones by students in experimental labs and the following exercise were done by the students…..

1.Estimation of exchangeable K; Ca and mg in soils.

2.Estimation of soil organic carbon, Estimation of alkalinehydrolysable N in soils.

3. Estimation of DTPA extractable Zn insoils. Estimation of N in plants

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

Objective:-

This subjects aims to know how the pest attack to stored grains and what are the pest attack to crops,Different losses of stored grain can involved and how it can be stored without attack of insects with preventive measures.

Theory

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, and

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, 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. Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

Practical

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments. Identification of insect pests and Mites associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. Fumigation of grain store / godown. Identification of rodents and rodent control operations in godowns. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition. Visit to Indian Storage Management and Research Institute, Hapur and Quality Laboratory, Department of Food., Delhi. Visit to nearest FCI godowns.

Outcome:-This subject is very useful to students by following practical exercise

1.Identification of different types of damage

2. Determination of insect infestation by different methods.

3. . Assessment of losses due to insects & Calculations on the doses of insecticides application technique.

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

Objective:-
This subject aims to know about disease attack to horticulture and field crops and their symptoms.It explain about how to manage the disease by using fungicides to a suitable crop.

Theory
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, 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; 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. 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; 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.

Practical

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

Outcome:-This subjects is very important to know about the disease cycle and management of major disease of crops.students can know about this subject majorily by practical experiments…to observe or identify smut,blast and different symptoms appears on different crops.

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

Objective:-

This subject aims to know about techniques which is used to improve crop and study about hybrids and varieties for yield &how to improve it To know about the Major
breeding objectives and procedures.

Theory

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops; 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; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

Practical

Floral biology, emasculation and hybridization techniques in different crop species; viz., Rice,Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Seasame, Caster, Cotton, Cowpea, Tobacco, Brinjal, Okra and Cucurbitaceous crops. Maintenance breeding of different *kharif* crops. Handling of germplasm and segregating

populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in *Kharif* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, donor parents for different characters; Visit to seed production plots Visit to seed production plots

Outcome:-

This subject is very helpful to know about different techniques like emasculation and hybridization techniques in different crops .Most of the exercise were learn by practically in lab like Layout of field experiments, Study of quality characters, Visit to seed production plots, Visit to seed production plots.

Entrepreneurship Development and Business Communication 2 (1+1)

Objective:-
This subject helps to study about characteristics of entrepreneur, importance of entrepreneur and what is meant by agribusiness how it should be develop to people &Develop business leadership skills, managerial skills.

Theory

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs;SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development, Impact of economic reforms on Agribusiness/ Agrienterprises, Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill, Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for agrientrepreneurship and rural enterprise.

Practical

Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing, visit to entrepreneurship development institute and entrepreneurs.

Outcome:-

This subject explain about identification and selection of business idea, Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement Motivation.Make students to visit to entrepreneurship development institute and entrepreneurs.

Geoinformatics, Nano-technology and Precision Farming 2(1+1)

Objective:-This subject aims to know about the different technologies were develop in precision farming &; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture. To know about Nano- technology & Use of nanotechnology in seed, water, fertilizer,plant protection for scaling-up farm productivity.

Theory

Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture. Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; 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; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture; Nanotechnology, definition, concepts and techniques, brief 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.

Practical

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

Outcome:-

This subject is very helpful to students to know about precision farming and how to develop it by using different technologies,like Use of GPS for agricultural survey, Fertilizers recommendations based of VRTand STCR techniques.

Practical Crop Production-II *(Rabi Crops)* 2(0+2)

Objective:-

This subject aims to know about how to cultivate crops and to know about weed management ,insect-pest disease of crops and harvesting, threshing, drying winnowing, storage and marketingof produce.

Practical

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students

outcome:-

This subject is helpful to students by practical exercise like: Field preparation, seed,treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce.

Intellectual Property Rights 1(1+0)

Objective:-

This subject aims to know about Introduction and meaning of intellectual property, Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.

Theory

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. Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets. Patents Act 1970 and 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. 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. 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.

Outcome:-

This subject help to students to know about Protection of plant varieties under UPOV and PPV&FR Act of India, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights.

Landscaping 3(2+1)

Objective:-

This subject aims to know about how to plan garden and components required for making garden styles and types. How we can make shape and improve asthetic value to garden plants &to know about propagation and planting methods in garden plants.

Theory

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes. Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme, Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

Practical

Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes.

Outcome:-

This subject can improve students knowledge in planning of different garden styles, Propagation of trees, shrubs and annuals,care and maintenance of plants, potting and repotting, layout of formal gardens, informal gardens, special type of gardens.

VI SEMESTER

Rainfed Agriculture and Watershed Management – (New) 2(1+1)

Objective :-

This subject helps to know about rainfed agriculture and soil climatic conditions and drought and its types , effective utilization of water and concepts & principles of watershed management.

Theory

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershedin India; Problems and prospects of rainfed agriculture in India ; Soil and climatic conditions prevalent in rainfed areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought; Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices,Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.

Practical

Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation. Studies on cultural practices for mitigating moisture stress. Characterization and delineation of model watershed. Field demonstration on soil & moisture conservation measures. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed**.**

Outcome:-

This subject helps to know about soil & moisture conservation measures and construction of watershed and cropping patterns fallowing in different areas.

Protected Cultivation and Secondary Agriculture 2(1+1)

Objective:-

This subjects helps to study about the green house technology and commercial grain drier ,moisture measurement and post harvest laboratories which helps to farmers for reducing the losses to moisture.

Theory

Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. Cost estimation and economic analysis.
Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer).Material handling equipment; conveyer and elevators, their principle, working and selection.

Practical

Study of different type of green houses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of green house equipments. Visit to various Post Harvest Laboratories. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

Outcome:-

This subject helps to study about the green house & its equipments and different types of green houses based up on shape. It will helps to the farmers for increasing yield.

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

Objective :-

This subject helps to know about symptoms ,etiology, disease cycle management of field crops and diagnosis of diseases in field crops.

Theory

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, 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; 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. 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 blackrot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; 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.

Practical

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

Outcome:-

This subjects helps to know about disease management practices of field crops and it will helps to the farmers for reducing the losses with low cost**.**

Post-harvest Management and Value Addition of Fruits and Vegetables 2(1+1)

Objective:-

This subject helps to know about pre harvesting factors and respiration factors & value additional products, concepts & methods of preservation and drying and dehydration of fruits & vegetables, packaging practices .

Theory

Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning -– Concepts and Standards, packaging of products.

Practical

Applications of different types of packaging, containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

Outcome:-

This subject helps to know about the preservation and packaging practices of fruits and vegetables and value addition. It will helps to reducing the spoilage of fruits and more income to the farmers.

Management of Beneficial Insects 2(1+1)

Objective :-

This subject aims to know about the insects which are beneficial to our human needs & crop needs like pollination , honey production and silk production . students know about the causing damage to the silkworm and how silkworm products were useful to our daily needs.

Theory

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.
Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control.
Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance.

Practical

Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. Identification and techniques for mass multiplication of natural enemies.

Outcome :-

This subject helps to know about the mulberry cultivation by the practical experiments like method of harvesting and preservation of leaves in practical exercise students have to visit to research and training centers devoted to beekeeping and sericulture, lac culturing .

Crop Improvement – II (*Rabi*) 2(1+1)

Objective :-

This subject aims to know about the crops either horticulture or agricultural crops and what are the methods were follow to improve the crops with quality and quantitative characters . Devolopment of hybrid and varieties for yield.

Theory

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology of *rabi* crops. Ideotype concept and climate resilient crop varieties for future.

Practical

Floral biology, emasculation and hybridization techniques in different crop species namely Wheat, Oat, Barley, Chickpea, Lentil, Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower, Safflower, Potato, Berseem. Sugarcane, Tomato, Chilli, Onion; Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in *Rabi* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, study of donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops

Outcome:-

This subject is very useful to the students by the practical exercises which were done in the field like emasculation & hybridization techniques in different crops and study of field techniques for seed production in rabi crops.

Principles of Organic Farming 2(1+1)

Objective :-

This subject aims to know about what is mean by organic farming and how it is useful to the Crops and environment by reducing the pollution and it helps to know about the farmers by reducing the usage of the inorganic fertilizers.

Theory

Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

Practical

Visit of organic farms to study the various components and their utilization; Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis; Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management; Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling.

Farm Management, Production and Resource Economics 2(1+1)

Theory

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and productproduct relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage. Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labour income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises. Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts.

Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises. Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies**,** Crop/livestock/machinery insurance – weather based crop insurance, features, determinants of compensation. Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss, solutions, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

Practical

Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs. Selection of most profitable enterprise combination. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India.

Outcome :-

This subjects is very important to know about the organic farming and how to cultivate crops in organic way. This subject explains practically how to improve the crop by organic farming and some exercises were done practically by the students.

Principles of Food Science and Nutrition 2(2+0)

Objective :-

This subject explains about principles and practices of food processing and preservation .How to preserve the food products without loss of nutrients ,minerals & new trends were follow in food science and nutrition.

Theory

Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis,surface tension, colloidal systems etc.); Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactives, important reactions); Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods); Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.); Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders; Energy metabolism (carbohydrate, fat, proteins); Balanced/ modified diets, Menu planning, New trends in food science and nutrition.

Outcome :-

This subject is very useful to the students to know about the concepts of food science & balanced modified diets.Students can know about the subject by some the practical exercises done in lab.

Micro propagation Technologies 3(1+2)

Objective :-

This subject aims to know about the new techniques which were develop by the different crops , To know about the cell culture ,callus , Somatic embryogenesis.

Theory

Introduction, History, Advantages and limitations; Types of cultures (seed, embryo, organ, callus, cell), Stages of micropropagation, Axillary bud proliferation (Shoot tip and meristem culture, bud culture),Organogenesis (callus and direct organ formation), Somatic embryogenesis, cell suspension cultures, Production of secondary metabolites, Somaclonal variation, Cryopreservation

Practical

Identification and use of equipments in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques for explants, Preparation of stocks and working solution, Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction, Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures.

Outcome :-

This subject helps to know about culturing of explants and the following exercises which were done in the lab.

1. Identification and use of equipments in tissue culture Laboratory.
2. Preparation of stocks and working solution.
3. Callus induction .
4. Induction of somatic embryo regeneration of whole plants from different explants .

BHAGWANT UNIVERSITY

INSTITUTE OF AGRICUTURAL SCIENCES & RESEARCH

ORDINANCES GOVERNING

B.Sc.(Ag.) COURSES

2017-2018

Ordinances Governing B.Sc. (Agriculture)
4 year Course Leading to Bachelors Degree of Science in agriculture

1. **APPLICAVILITY :**

This Ordinance shall apply to Bachelors Degree of Science (Agriculture) Course leading to the degree of Bachelor of Science.

2. **DEFFINTIONS :**

(i) **Academic Programme /Programmes** shall mean a programme of course and /or any other Component leading to the degree of Bachelor of Science.

(ii) **Academic Year** is a period of 12 months devoted to completion of requirements specified in the Scheme of Teaching and the related examinations.

(iii) **Board of Studies (BOS)** shall mean the Board of Studies of the Institute concerned.

(iv) **Course** means a component of the academic programme, carrying a distinctive code no. and specific credits assigned to it.

(v) **Credit**: one credit is defined as one hour lecture/ two hour lab/3 hour field work per week

(vi) **University** shall mean Bhagwant University.

(vii) **Institute** shall mean Institute of Agricultural Sciences and Research.

(viii) **Examiner** shall mean an examiner who is not in the employment of the University.

(ix) **Semester System** – A programme wherein each academic year is apportioned into two parts known as semesters.

(x) **Student** shall mean a person admitted and registered for degree programme in the Institute Agricultural Sciences and Research.

3. **ADMISSION**

Admission to 4 year Course Leading to degree programmes will be made as per the rules prescribed by the Academic Council of the University.

3.1 ELIGIBILITY FOR ADMISSION

(a) No candidate shall be eligible for admission unless he/she has passed the class-12th in PCB/PCBM/Agriculture.

(b) Has cleared the eligibility test such as University Entrance Exam/Any other National or State examination which is considered to be equivalent.

4. DURATION OF COURSE

(a) Total duration of the Course Leading to degree programmes shall be 4 years, each year comprising of two semesters.

(b) The Maximum permissible period for completing programmes for which the prescribed programme shall be 10 semesters. Under very special circumstances, the total period may further be extended upto 14 semesters with the approval of the Vice-Chancellor. This excludes the period of expulsion or suspension by the University/medical leave.

5. CURRICULAM AND MINIMUM CREDIT REQUIREMENT.

2 Semesters per year	Total 8 semester
Time	110 working days consisting of 95 instructional days and 15 examination days.
Class hours per week	24 class hours

The minimum credit requirement for graduate degree should be 160 credit excluding NCC/NSS.

6. ATTENDANCE

All Students are normally expected to have and attendances of 75% in each subject. The Vice- Chancellor may give relaxation upto 15% on account of illness and other pre-approved occasion. However, under no circumstances. A student with an attendance of less than 60% in a subject, shall be allowed to appear in the semester-End examination of that subject

In case any student appears in the examination by default, who infect has been detained by the institute, his or her result shall be treated as null and void.

7. CANCELLATION OF ADMISSION

The admission of a Student at any stage of study shall be cancelled if:

a) He/She is not found qualified as per UGC/State Government/university norms and guidelines or the eligibility criteria prescribed.

or

b) He/She is involved in ragging.

or

c) He/She is found unable to complete the course within the stipulated time as prescribed.

d) He/She is found involved in creating indiscipline in the Intuition/College or in the University.

8. BOARD OF STUDIES

The constitution of the Board of Studies shall be :

(a) The Director of the Institute (Chairperson)

(b) Two Professors

(c) Two Associate Professors

(d) Two Assistant Professors

(e) Two Expert Members

9. ACADEMIC PROGRAMME COMMITTEE

(a) There shall be an Academic Programme Committee in the Department / Institute of the University.

(b) All the teachers of an Institute of Study shall constitute the Academic Programme Committee of which the Director of the Institute shall act as its Chairperson. This Committee shall coordinate the implementation of the courses for optimum utilization of resources and shall also take care of the coordination of the B.Sc. Agriculture programmes with the other programmes run by the different Institutes of the University.

(c) The Academic programmes Committee shall meet as and when required. But at least once every semester. The Chairperson of the Committee will convene the meetings.

10. EVALUATION

The examination of the university will be open to all regular/ re-admitted / ex-student who have undergone a course of study in the university for a period specified for the programmed of study in the teaching and evaluation scheme and are not debarred from appearing in the end – semester examinations as provided in the applicable ordinance of the university.

(a) The overall weight age of a course in the Syllabi shall be determined in terms of credited assigned to the course.

(b) The distribution of weight age for various components of evaluation shall be as defined in the Teaching & Evaluation Scheme.

(c) **Conduct of Semester-End Examination** :-

(i) All semester – end examination shall be conducted by the Controller of Examinations.

(ii) The schedule of examination shall be notified by the Controller of Examination at least 10 days prior to the first day of the commencement of semester – end examination.

(iii) For theory as well as practical examination as viva-voce, the concerned subject teacher (s) shall be the Internal Examiners. In case any External Examiners are desired, then the same shall be appointed by the Controller of Examinations with the recommendations of the Vice- Chancellor of the university.

(d) Assessment :

All courses undertaken by students are evaluated during the semester using internal system of continuous assessment. The students are evaluated on class/tutorial participation, lab work, midterm tests and end semester examinations, which contribute to the final grade awarded for the subject. Students will be notified at the commencement of each courses about the evaluation methods being used for the courses and weight agers given to the different assignments and evaluated activities.

In order to make the evaluation system as similar and transparent with any of the globally reputed educational institutions like Agricultural University and Research Institutes. Here marks obtained in the continuous assessment and end semester

examination are added together and a 10- point grading system will be used to award the student with on overall letter grade for the course (Subject).

Distribution of Marks

Courses without Practical components

Two mid – Term Examination	15 + 15 = 30
End – Term Examination	= 70
Total	= 100

Course with Practical Components

Two mid – Term Examination	15 + 15 = 30
Practical Examination	=20
End – Term Examination	= 50
Total	= 100

11. SIGNIFICANCE OF GRADES:

The examinations conducted throughout the semester shall be evaluated in numerals assigning 100 marks to each course. The numerical rating shall be converted to ten point system by placing a decimal before the last digit called here-in-after "grade".

GRADE For B.Sc.(Ag.)	EXPRESSION
8.00 and above	Excellent
7.00-7.99	Good
6.00-6.99	Fair
5.00-5.99	Pass
Below 5.00	FAIL

12. EQUIVALENCE OF GRADES IN PERCENT AND AS DIVISION:

Grade x 10.0	= % marks
60% and above	= First Division
Above 50% but below 60%	= Second Division
Below 50%	= Fail

CALCULATION OF GP, GPA, and OGPA:

Grade point and overall grade point average shall be calculated as illustrated here under

Credits	**Marks**				**Grade**		**OGPA**
(Theory + practical)	**Mid-term**	**End-term**	**Pract**	**Total**	**Grade**	**Grade Point (GP)**	**53.6 ÷ 7 = 7.657**
3 (2+1)	25	33	22	80	8.0	24.0	
2 (2+0)	28	50	-	78	7.8	15.6	
2(0+2)	18	-	52	70	7.0	14.0	
7 (4+3)						53.6	

Note :-

Grade Point (GP) : Grade x Credit

Grade Point Average : GP/Credit

Over All Grade Point Average (OGPA) : Total GP/Total Credits

Grade : Total Marks in a Course / 10

13. MINIMUM GRADE POINT REQUIREMENT FOR PASSING A COURSE/SEMESTER/DEGREE PROGRAMME:

Minimum grade points required are given below;

Passing requirement of	
A course	5.0
A semester	5.5
An academic year	5.5
Degree programme	5.5

14. IMPROVEMENT OF GP/OGPA:

A repeat examination shall be held for both the odd and even semesters at the end of the concerned academic year for those students who have failed in any of the courses taught during one or both of the semesters or have failed to appear in any of the examinations, if otherwise, eligible. Students who could not appear in the examinations shall be required to produce valid reasons for the absence.

A repeat examination shall not be held for any of the B.Sc. (Ag.) VII semester Rural Agricultural Work Experience (RAWE) and Experiential Learning courses. In case a candidate fails he /she shall be required to register for a semester and fulfill the requirement.

15. **USE OF UNFAIR MEANS:**

All reported cases for use of unfair means in the examination shall be placed before a Standing 'Unfair Means Hearing Committee' for decision on case basis. The actions under the category of 'Use of Unfair Means' and procedure for dealing with such cases of suspected/alleged/reported use of unfair means shall be specified by the Academic Council.

The following would be considered as unfair means adopted during examinations and other contexts:

i. Communicating with the fellow students for obtaining help.
ii. Copying from the other student's script/report/paper etc.
iii. Possession of any incriminating document whether used or not.
iv. Any approach in direct or indirect form to influence teacher/ invigilator.
v. Unruly behavior, which disrupts academic environment.

17) **STUDENTS GRIEVANCE COMMITTEE:**

In case of any written representation /complaints received from the students within seven days after completion of the examination regarding setting up of the question paper etc. along with specific recommendations of the course Co-ordinators & Director of the Institute, the same shall be considered by the Students Grievance Committee to be constituted by the Vice-Chancellor The Vice Chancellor shall take appropriate decision on the recommendations of the Students Grievance Committee, before the declaration of result (s) of the said examination.

18) **AWARD OF DEGREE**

A student shall be awarded a degree if :

i) He/She has registered himself/herself, undergone the course of study, fulfilled the all requirements and secured the minimum credits prescribed for award of the concerned degree.
ii) Completion of all prescribed courses of total credits.

iii) Passing of all courses individually with minimum Overall Grade Point Average (OGPA) of 5.5.

iv) There are no dues outstanding in his/her name of a Institute of the University/constituent Institution And

v) No disciplinary action is pending against him/her.

16. Notwithstanding anything stated in this Ordinance, for any unforeseen issues arising, and not covered by this Ordinance, or in the event of differences of interpretation , Vice Chancellor may take a decision after obtaining, if necessary, the opinion/ advice of a Committee consisting of any or all the Directors of the Institutes. The Decision of the Vice-Chancellor shall be final.