B.Sc. (Ag.) (IST) Year

Ist Semester **w.e.f-2016-2017**

Subject Code	**Subject Name**	**Credits**
AG- 101	Fundamentals of Horticulture	2(1+1)
AG -102	Fundamentals Of Plant Biochemistry & Biotechnology	3(2+1)
AG -103	Fundamentals of Soil Science	3(2+1)
AG -104	Introduction to Forestry	2(1+1)
AG -105	Comprehension & Communication Skills in English	2(1+1)
AG -106	Fundamentals of Agronomy	4(3+1)
AG 107(A)	Introductory Biology*	2(1+1)
AG -107(B)	Elementary Mathematics*	2(2+0)*
AG -108	Agriculture Heritage*	1(1+0)
AG -109	Rural Sociology & Education Psychology	2(2+0)
AG -110	Human Values & Ethics**	1(1+0)
AG -111	NSS/NCC/Physical Education & Yoga Practices**	0(0+0)
Total	***R: Remedial course; **NC: Non-gradial courses**	**22**

SUBJECT CODE-AG 101 **Credit: 2(1+1)**

Fundamentals of Horticulture **w.e.f.-2016-2017**

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

UNIT-2- Plant propagation-methods and propagating structures; principles of orchard establishment; Principles and methods of training and pruning, juvenility and flower bud differentiation.

UNIT-3- unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy;

UNIT-4- kitchen gardening; garden types and parts; lawn making.

UNIT-5- medicinal and aromatic plants; species and condiments; use of plant bio-regulators in horticulture. Irrigation & fertilizers application-method and quantity.

Practical

1.Identification of garden tools. Identification of horticultural crops.
2.Preparation of seed bed/nursery bed.
3.Practice of sexual and asexual methods of propagation.
4.Layout and planting of orchard plants. Training and pruning of fruit trees.
5.Transplanting and care of vegetable seedlings.
6.Making of herbaceous and shrubbery borders. Preparation of potting mixture, potting and repotting. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

References

1. Basic Horticulture - Jitendra Singh.
2. Plant propagation and nursery husbandry - Dr. Jay veer singh.
3. Udyan vigyan - Dr Shyam sundar shristava.

SUBJECT CODE-AG 102 Credit: 3(2+1)

Fundamentals of Plant Biochemistry and Biotechnology w.e.f.-2016-2017

UNIT-1. Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification, Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation; Structure of Disaccharides and Polysaccharides.

UNIT-2. 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.

UNIT-3. Nucleic acids: Importance and classification, Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates, Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

UNIT-4. 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.

UNIT-5. Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods, Transgenics and its importance in crop improvement; PCR techniques and its applications: RFLP, RAPD, SSR; Marker Assisted Breeding in crop improvement; Biotechnology regulations.

Practical

1. Preparation of solution, pH & buffers, Qualitative tests of carbohydrates and amino acids. Quantitative estimation of glucose/ proteins.
2. 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.
3 Sterilization techniques. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium
4. Callus induction from various explants. Micro-propagation, hardening and acclimatization.
5. Demonstration on isolation of DNA. Demonstration of gel electrophoresis techniques and DNA finger printing.

References

1. Biotechnology – B.D. Singh,
2. Agriculture Biotechnology – Gautam V.K.
3. Elements of biotechnology- P.K.Gupta
4. Fundamental of plant biochemistry and biotechnology- Omkar Singh, L.L. Sharma, T.P. Sing

SUBJECT CODE-AG 103 **Credit: 3(2+1)**

Fundamentals of Soil Science **w.e.f.-2016-2017**

UNIT-1-Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile.

UNIT-2- 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.

UNIT-3-Soil water retention, movement and availability; soil air, composition, gaseous exchange, problem and plant growth; source, amount and flow of heat in soil; soil temperature and plant growth; Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability.

UNIT-4-soil colloids - inorganic and organic; silicate clays: constitution and properties; sources of charge ion exchange, cation exchange capacity, base saturation; soil organic matter: composition, properties and its influence on soil properties.

UNIT-5-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

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

References

1. The Nature and Properties of Soil – Brady, N.C. & Weil, R.R., Macmillan
2. Fundamentals of Soil Science – ICAR Publication, New Delhi
3. Text Book of Soil Physics – A.K. Saha, Kalyani Publication, New Delhi
4. Introductory of Soil Science – Dr. Dilip kumar das
5. Soil Science Fertilizers and Manures – Dr vinay singh

SUBJECT CODE-AG 104 **Credit: 1(1+1)**

Introduction to Forestry **w.e.f.-2016-2017**

UNIT-1-Introduction – definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies.

UNIT-2- 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.

UNIT-3-Forest mensuration – objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement - shadow and single pole method; Instrumental methods of height measurement - geometric and trigonometric principles, instruments used in height measurement; tree stem form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees.

UNIT-4- Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country.

UNIT-5-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

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

References

1. Principles and Practice of Silviculture – Laxman Singh Khanna
2. Indian Forestry – K. Manikandan
3. Forest Mensuration – A. Akca

SUBJECT CODE-AG 105 **Credit: 2(1+1)**

Comprehension & Communication Skills in English w.e.f.-2016-2017

UNIT-1-War minus Shooting- The sporting Spirit. A Dilemma- A layman looks at science Raymond B. Fosdick.

UNIT-2- You and Your English – Spoken English and broken English G.B. Shaw. Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words.

UNIT-3- Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations.

UNIT-4-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.

UNIT-5-The Style: Importance of professional writing. Preparation of Curriculum Vitae and Job applications. Synopsis Writing. Interviews: kinds, Importance and process.

Practical

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

References

1. Professional Ethics and Human Values - M.Govindarajan, S. Natarajan & V.S. Senthil Kumar
2. Human values - A.N. Tripathi
3. Human Values and Professional Ethics S. B. Gogate
4. Ethics Integrity and Aptitude – P.D. Sharma 5. Manviya mulya avam pashewar natikta – Sanjeev kumarBhalla&RupaBha

SUBJECT CODE-AG 106 **Credit: 4(3+1)**

Fundamentals of Agronomy **w.e.f.-2016-2017**

UNIT-1-Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry,

UNIT-2-Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil plant water relationship, crop water requirement, water use efficiency.

UNIT-3-irrigation- scheduling criteria and methods, quality of irrigation water, water logging. Weeds- importance, classification, crop weed competition, concepts of weed management-principles and methods, herbicides- classification, selectivity and resistance, allelopathy

UNIT-4-Growth and development of crops, factors affecting growth and development, plant ide types,

UNIT-5- crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Practical

1. Identification of crops, seeds, fertilizers, pesticides and tillage implements,
2. Effect of sowing depth on germination and seedling vigour,
3. Identification of weeds in crops,
4. Methods of herbicide and fertilizer application,
5. Study of yield contributing characters and yield estimation,
6. Seed germination and viability test,
7. Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement,
8. Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill,
9. Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

References

1. Principles of Agronomy - S.R. Reddy (1999), Kalyani Publication, New Delhi
2. Hand Book of Agriculture (2006) - ICAR Publication
3. Principles Of Agronomy and Crops- Om Prakash Ahalawat

REMEDIAL COURSE

SUBJECT CODE-AG 107(A) **Credit: 2(1+1)**

Introductory Biology **w.e.f.-2016-2017**

UNIT-1-Introduction to the living world,

UNIT-2-diversity and characteristics of life, origin of life, Evolution and Eugenics.

UNIT-3- Binomial nomenclature and classification Cell and cell division.

UNIT-4- Morphology of flowering plants. Seed and seed germination.

UNIT-5-Plant systematic-viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture.

Practical

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

References

1. Fundamental of biology, textbook and practice book – By Willey editorial.
2. Introductory plant biology – James bidlade and Shalley Jnsky
3. A text book of botany- B.P. pandey

SUBJECT CODE-AG 107(B) **Credit: 2(2+0)**

Elementary Mathematics **w.e.f.-2016-2017**

UNIT-1-Straight lines : Distance formula, section formula (internal and external division), Change of axes (only origin changed), Equation of co-ordinate axes, Equation of lines parallel to axes, Slope-intercept form of equation of line, Slope-point form of equation of line, Two point form of equation of line, 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,

UNIT-2- 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 (x_1, y_1) & (x_2,y_2), Tangent and Normal to a given circle at given point (Simple problems), Condition of tangency of a line $y = mx + c$ to the given circle $x^2 + y^2 = a^2$.

UNIT-3-Differential Calculus : Definition of function, limit and continuity, Simple problems on limit, Simple problems on continuity, Differentiation of x^n , e^x , sin x & cos x from first principle, 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,

UNIT-3-Differentiation of Inverse Trigonometric functions. Maxima and Minima of the functions of the form y=f (x) (Simple problems based on it).

UNIT-4-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).

UNIT-5-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**.**

References

1. Remedial Mathematics- D.C. Agrawal

SUBJECT CODE-AG 108 **Credit: 1(1+0)**

Agriculture Heritage **w.e.f.-2016-2017**

UNIT-1-Introduction of Indian agricultural heritage, status of farmers in society; advice by sages to kings on their duties towards farmers.

UNIT-2-soil management in ancient, medieval & pre-modern India and its relevance in modern day sustainable agriculture, heritage of crop & water management,

UNIT-3-plant growth and development & plant protection through vrikshayurveda and traditional knowledge.

UNIT-4-Heritage of medicinal plants and their relevance today, seed health in ancient & medieval history and its relevance to present day agriculture,

UNIT-5-description of Indian civilization and agriculture by travelers from China, Europe and United States, our journey in agriculture, green revolution and its impact and concerns, vision for the future.

References

1. Principles of Agronomy - S.R. Reddy (1999), Kalyani Publication, New Delhi
2. Hand Book of Agriculture (2006) - ICAR Publication
3. Introductory Agriculture ICAR-e Course, AGRIMOON.COM
4. Introductory Agriculture- K.L. Nandeha, Kushal Publication and Distributors, Varanasi

SUBJECT CODE-AG 109

Credit: 2(2+0)

Rural Sociology & Educational Psychology w.e.f.-2016-2017

UNIT-1. Sociology and Rural sociology: Definition and scope.

UNIT-2. Sociology and Rural sociology: its significance in agriculture extension, Rural society, Social Groups, Social Stratification, Culture concept, Social Institution, Social Change & Development.

UNIT-3. Educational psychology: Meaning & its importance in agriculture extension.

UNIT-4. Behavior: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation,

UNIT-5. Behavior: Theories of Motivation, Intelligence.

References

1. Extension Communication and Management – G.L.Ray

2. Rural Sociology and Educational Psychology – Dr. B.D. Tyagi & Dr Manju Tyagi

3. Agriculture Extension, Training & Management- Dr Ummed Singh

4. Extension Education and Information – Dr. Jitendra Chauhan

NON-GRADIAL COURSES

SUBJECT CODE-AG 110 **Credit: 1(1+0)**

Human Values & Ethics **w.e.f.-2016-2017**

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

UNIT-2 Values and Ethics -Vision of Life, Principles and Philosophy.

UNIT-3 Self Exploration, Self Awareness, Self Satisfaction, Decision Making.

UNIT-4 Motivation, Sensitivity, Success, Selfless Service, Case Study of Ethical Lives, Positive Spirit.

UNIT-5 Body, Mind and Soul, Attachment and Detachment, Spirituality Quotient, Examination.

References

1. Professional Ethics and Human Values - M.Govindarajan, S. Natarajan & V.S. Senthil Kumar
2. Human values - A.N. Tripathi
3. Human Values and Professional Ethics S. B. Gogate
4. Ethics Integrity and Aptitude – P.D. Sharma
5. Manviya mulya avam pashewar natikta – Sanjeev kumar Bhalla & Rupa Bhalla

SUBJECT CODE-AG 111 **Credit: 0(0+0)**

National Service Scheme (NSS) **w.e.f.-2016-2017**

UNIT-1-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

UNIT-2-Understanding youth NSS programmes and activities Definition, profile, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analyzing guiding financial patterns of scheme, youth programme/ schemes of GOI, coordination with different agencies and maintenance of diary

UNIT-3-Community mobilization Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilization involving youth-adult partnership

UNIT-4-Social harmony and national integration Indian history and culture, role of youth in nation building, conflict resolution and peace-building **Volunteerism and shramdan** Indian tradition of volunteerism, its need, importance, motivation and constraints; shramdan as part of volunteerism

UNIT-5-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 organizations) and society

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